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ABSTRACT

This report presents results from the 1999 Survey of Industrial Research and Development. It contains a full set of statistics produced from the survey, trends in industrial research and development (R&D) since 1953, and statistics on employment since 1989. Contents include: (1) "Note to Users of Historical Statistics"; (2) "Detailed Statistical Tables"; (3) "Technical Notes and Technical Tables"; and (4) "Survey Documents." (YDS)

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Research and Development in Industry: 1999

Funds, 1999
Scientists and Engineers, January 2000

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Detailed Statistical Tables

Division of Science Resources Statistics
Directorate for Social, Behavioral, and Economic Sciences
National Science Foundation
March 2002

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Research and Development in Industry: 1999

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Detailed Statistical Tables

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INTRODUCTION

This report is the second of two publications containing results from the 1999 Survey of Industrial Research and Development. The first publication, a data brief announcing the availability of survey results, contains analytical information and highlights the increase in industrial research and development (R&D) funded from companies' own resources, increased sales and employment reported by R&D-performing firms, the new coding scheme, the North American Industrial Classification System, used to classify and present industry statistics, and the new company size classifications added to many of the statistical tables produced from the 1999 survey. This report contains, in section A, the full set of statistics produced from the survey including statistics on R&D funding during the calendar year 1999 and on R&D personnel in January 2000. Among the tables are several that include statistics on trends in industrial R&D since 1953, statistics on employment by R&D-performing firms since 1989, and a table classified by state that contains statistics for selected years since 1981. This report also contains in this introduction, in the table notes that follow, and in the technical notes in section B, information about the new industry coding classification system, new company size classifications, survey methodology, comparability of the statistics over time, survey definitions, history of the survey, and other information designed to convey to the data user what the survey statistics represent and, in some cases more importantly, what they do not represent. Survey forms, instructions, and other documents are reproduced in section C.

This report provides national estimates of the expenditures on R&D performed within the United States by industrial firms, whether U.S.- or foreign-owned. Among the statistics are estimates of total R&D, the portion of the total financed by the Federal Government, and the portion financed by the companies themselves or by other non-Federal sources such as state and local governments or other industrial firms under contract or subcontract. Total R&D is also separated into its character of work components (basic research, applied research, and development) and into the types of costs (wages, materials and supplies, depreciation, and other costs). Other statistics include R&D financed by a domestic firm but performed outside the United States, R&D contracted to organizations outside of the firm, and the funds spent to perform energy-related R&D. Also, this report provides information on R&D-performing firms including domestic net sales, number of employees, number of R&D-performing scientists and engineers, geographic location of where the R&D was performed, and R&D funds spent per R&D-performing scientist and engineer.

The National Science Foundation Act of 1950, as amended, authorizes and directs the National Science Foundation (NSF) "...to provide a central clearinghouse for the collection, interpretation, and analysis of data on scientific and engineering resources, and to provide a source of information for policy formulation by other agencies of the Federal Government." The Survey of Industrial Research and Development is the vehicle with which NSF carries out the industrial portion of this mandate and NSF's Division of Science Resources Statistics has sponsored and managed a survey of industrial R&D since 1953. The 1953–56 surveys were conducted by the Bureau of Labor Statistics (BLS) in the U.S. Department of Labor.[1] Since 1957, the Bureau of the Census in the U.S. Department of Commerce has conducted the survey.[2] Census staff conduct the survey under Title 13 of the United States Code, which prohibits publication or release of data or statistics that may reveal information about individual companies. Therefore, in some tables of this report, the symbol "(D)" is used to indicate that estimates were withheld to avoid possible disclosure of information about operations of individual companies.

The Survey of Industrial Research and Development is an annual sample survey that intends to include or represent all for-profit R&D-performing companies, either publicly or privately held. Respondents receive detailed definitions to help them determine which expenses to include or exclude from the R&D data they provide. Nevertheless, the statistics presented in this report are subject to response and concept errors caused by differences in the way respondents interpret the definitions of R&D activities and by variations in company accounting procedures. The survey's primary focus is on U.S. industry as a performer of, rather than as a source of funds for, R&D. Thus, data on Federal support of R&D activities performed by industry are collected, and the resulting statistics appear in several tables while statistics on industrial funding of R&D undertaken at universities and colleges and other nonprofit organizations are not collected or included.[3] The result of collecting and publishing performer-reported statistics is that the federally funded R&D performance totals presented in this report differ from the totals reported by the Federal agencies that provide the funds and the statistics published in NSF's *Federal Funds for Research and Development* report series. One reason for these differences is that performers of R&D often expend Federal funds in a year other than the one in which the Federal Government provides authorization, obligations, or outlays.[4] During the past several years, the differences have widened between the Federal R&D funding reported by performers and that reported by funding agencies. These differences are documented and analyzed in the latest edition in NSF's *National Patterns of R&D Resources* report series.

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[1] See NSF (1956) and NSF (1960).

[2] Data obtained in the earlier BLS surveys are not directly comparable with Census figures because of methodological and other differences.

The content of the Survey of Industrial Research and Development has been expanded and refined over the years in response to an increasing need by policymakers for more detailed information on the nation's R&D effort. For example, questions on energy R&D were added in the early 1970s, following the oil shortage crisis. On the other hand, collection of certain data items has been eliminated in recent years in an attempt to alleviate some of the burden on respondents. For large firms known to perform R&D, a detailed survey form (Form RD-1) is used to collect data. To limit the reporting burden on small R&D performers and firms included in the sample for the first time, an abbreviated survey form (Form RD-1A), which collects only the most crucial data, is used.

Several changes have been made to the survey since the early 1990s that are of special importance to users of this report. Prior to the 1992 survey, statistics were based on samples selected at irregular intervals (i.e., 1967, 1971, 1976, 1981, and 1987). In intervening years, a subset of the last sample, a panel, was used. The most recent sample before the 1992 survey was selected and first used for survey year 1987. Original estimates for 1988–91 were based on surveys of approximately 1,700 panel companies that reported R&D activity in the 1987 survey. Beginning with the 1992 survey, statistics are based on samples selected annually. Also beginning with the 1992 survey, the sample size was increased from approximately 14,000 to approximately 25,000 firms. Annual sampling and the increase in sample size were instituted for several reasons: (1) to account better for births of R&D-performing establishments in the survey universe; (2) to survey more fully and accurately R&D performed by nonmanufacturing firms, especially in the service sector; and (3) to gather more current information about potential R&D performers.

Prior to the 1994 survey cycle, all companies that spent more than $1 million annually on R&D in the United States or had 1,000 or more employees received a survey form every year. Beginning with the 1994 cycle, the employee cutoff was dropped from the criteria and, beginning with the 1996 cycle, the R&D level was raised to $5 million, where it has remained for subsequent surveys. For all cycles of the survey, the remaining firms (i.e., those that were not considered "certainties" because of the selection criteria) were subjected to probability sampling and may or may not receive a survey form for a given year. Among the organizations purposely excluded from the survey were trade associations and not-for-profit industrial consortia. Although their primary mission is to serve industry, these associations were excluded because they are nonprofit organizations.

Industry statistics in this report were developed from data collected from individual companies.[5] Since the survey is company-based rather than establishment-based, all data collected for the various components of each company (plants, divisions, or subdivisions) were tabulated in the company's major industrial classification, which was based on payroll.[6] The resulting industry estimates were estimated by summing the data for companies classified within each major industry classification. National totals were then estimated by summing the industry estimates. Beginning with the 1999 survey, a company's major industrial classification was determined and the resulting industry statistics are published using the North American Industrial Classification System (NAICS). For prior years, the Standard Industrial Classification (SIC) system was used. The development and on-going refinement of NAICS has been a joint effort of statistical agencies in Canada, Mexico, and the United States. The system replaced the Standard Industrial Classification (1980) of Canada, the Mexican Classification of Activities and Products (1994), and Standard Industrial Classification (1987) of the United States.[7] NAICS was designed to provide a production-oriented system under which economic units with similar production processes are classified in the same industry. NAICS was developed with special attention to classifications for new and emerging industries, service industries, and industries that produce advanced technologies. NAICS not only will ease comparability of information about the economies of the three North American countries, but potentially will increase comparability with the two-digit level of the United Nations' International Standard Industrial Classification (ISIC) system.

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[3] Data on R&D performed at universities and colleges are collected in the annual Survey of Research and Development Expenditures at Universities and Colleges. More information about this survey is available from NSF's Research and Development Statistics Program in the Division of Science Resources Statistics.

[4] For definitions of these terms, see section B, "Comparisons to Other Statistical Series."

[5] In the Survey of Industrial Research and Development and in the publications presenting statistics resulting from the survey, the terms "firm," "company," and "enterprise" are used interchangeably. "Industry" refers to the 2-, 3-, or 4-digit North American Industrial Classification System (NAICS) codes or group of NAICS codes used to publish statistics resulting from the survey.

[6] See section B, "Frame Creation."

Important for the Survey of Industrial Research and Development is the creation of several new classifications that cover major performers of R&D in the U.S. Among manufacturers, the computer and electronic products classification (NAICS 334) includes makers of computers and peripherals, semiconductors, and navigational and electromedical instruments. Among nonmanufacturing industries are information (NAICS 51) and professional, scientific, and technical services (NAICS 54). Information includes publishing, both paper and electronic, broadcasting, and telecommunications. Professional, scientific, and technical services includes a variety of industries. Of specific importance for the survey are those that provide engineering and scientific R&D services.

The change of industry classification system affects most of the statistical tables produced from the survey. Prior to this report tables classified by industry have contained the current survey's statistics plus statistics for ten previous years. Because of the new classification system, tables now contain only statistics from the current year's survey. However, to provide a bridge for users who want to make year-to-year comparisons below the aggregate level, in several tables statistics from the 1997 and 1998 cycles of the survey, which were previously classified and published using the SIC system, have been reclassified using the new NAICS codes. These reclassified statistics are slotted using their new NAICS classifications alongside the 1999 statistics, which were estimated using NAICS from the outset.

Another enhancement beginning with 1999, is an increase in the number of company size categories used to classify survey statistics. The original 6 categories have been expanded to 10 to emphasize the role of small companies in R&D performance. During 1998, companies with fewer than 500 employees spent $30.2 billion on industrial R&D performed in the United States. During 1999, they spent $34.1 billion. Of this amount 21 percent ($7.0 billion) was spent by the smallest companies (those with at least 5 but fewer than 25 employees). The 1999 statistics further show that there was more growth in the amount of R&D performed by smaller companies than in the amount performed by larger companies. The more detailed business size information also facilitates better international comparisons. Generally, statistics produced by foreign countries that measure their industrial R&D enterprise are reported with more detailed company size classifications at the lower end of the scale than U.S. industrial R&D statistics historically have been.[8] The more detailed classifications of the U.S. statistics will enable more direct comparisons with other countries' statistics.

Specific questions regarding the survey may be directed to Raymond Wolfe at (703) 292-7789, rwolfe@nsf.gov, or at the following mailing address:

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Division of Science Resources Statistics
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[7] For a detailed comparison of NAICS to the Standard Industrial Classification (1987) of the United States, visit http://www.census.gov/epcd/www/naics.html.

[8] For more information, visit the Organisation for Economic Co-operation and Development (OECD) website at http://www.oecd.org

NOTE TO USERS OF HISTORICAL STATISTICS

This report contains the latest revised statistics from the Survey of Industrial Research and Development for 1953–99.

The Industrial Research and Development Information System (IRIS) provides online access to an historical database with more than 2,500 statistical tables containing all industrial research and development (R&D) data published by NSF from 1953 through 1998. IRIS is available on the Division of Science Resources Statistics web site at: http://www.nsf.gov/sbe/srs/iris/start.htm.

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COMPANY SIZE

Companies were categorized by total number of domestic employees. See section B, "Comparability of Statistics," for information on how this expanded array of company size classes compare to size classes used in previous reports. The following are the size classes used in this report:

- 5 to 24 employees;
- 25 to 49 employees;
- 50 to 249 employees;
- 250 to 499 employees;
- 500 to 999 employees;
- 1,000 to 4,999 employees;
- 5,000 to 9,999 employees;
- 10,000 to 24,999 employees; and
- 25,000 or more employees.

The survey excludes companies with fewer than 5 employees to limit burden on small business enterprises in compliance with the Office of Management and Budget's (OMB) guidelines for Federal Government agencies. To reduce the variability in the statistics that can be attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes are assigned to them, the frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector companies with employment of 50 or more and in the non-manufacturing sector companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values (but with at least 5 employees) were included in the small company partition. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. In the tables, statistics from the small company partition are shown separately, but are included in "manufacturing," "nonmanufacturing," and "all industries" totals.[9]

CURRENT AND CONSTANT DOLLARS

Statistics in all tables are reported in current dollars. Constant dollars are also presented in the summary tables (A-1, A-25, A-26, and A-27). Gross domestic product (GDP) implicit price deflators were used to convert current to constant dollars.

DISCLOSURE AND SUPPRESSION OF STATISTICS

Title 13 of the United States Code prohibits publication or release of data or statistics that may reveal information about individual companies. Therefore, the data in some table cells may have been deleted and replaced with "(D)." This occurs when a small number of companies account for a large percentage of the estimate in a particular data cell. Although publication of certain cells may be withheld, the estimates in the cells are always included in totals. The tables most often affected by cell suppression are those that contain data on Federal support for R&D performance.

GEOGRAPHIC STATISTICS

The statistics in this report cover only those operations located in the 50 states and the District of Columbia. Statistics on company-sponsored R&D performed outside the United States by foreign subsidiaries of U.S. domestic companies are included in tables A-11 and A-12 but excluded from all other tables.

IMPUTATION

Missing data for major data items were estimated using mathematical algorithms developed from industry comparisons, data from previous cycles of the survey, and other information. Therefore, the statistics in some table cells may be accompanied by the notation "(S)," which indicates that the imputation rate—the percentage of the statistic not reported by respondents and consequently estimated—exceeds 50 percent for that item. In such cases, the estimate may be statistically unreliable. See table B-5 for imputation rates for specific items.

INDUSTRY CLASSIFICATION

One North American Industrial Classification System (NAICS) code was assigned to each company.

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[9] See "Frame Creation" and "Sample Selection" in section B for more information on the 5-employee cut-off and partitioning of the statistical sample.

Multi-establishment companies were assigned a single code based on the most dominant aggregated activity for that firm in terms of total payroll. See section B for information on NAICS and how it compares with the Standard Industrial Classification (SIC) system used in previous reports. Statistics for the following industries and industry groupings are published in this report (NAICS codes are given on the right[10]):

MANUFACTURING INDUSTRIES	31+32+33
Food	311
Beverage and tobacco products	312
Textiles, apparel, and leather	313+314+315+316
Wood products	321
Paper, printing and support activities	322+323
Petroleum and coal products	324
Chemicals	325
Basic chemicals	3251
Resin, synthetic rubber, fibers, and filament	3252
Pharmaceuticals and medicines	3254
Other chemicals	325 minus (3251+3252+3254)
Plastics and rubber products	326
Nonmetallic mineral products	327
Primary metals	331
Fabricated metal products	332
Machinery	333
Computer and electronic products	334
Computers and peripheral equipment	3341
Communications equipment	3342
Semiconductor and other electronic components	3344
Navigational, measuring, electromedical, and control instruments	3345
Other computer and electronic products	334 minus (3341+3342+3344+3345)
Electrical equipment, appliances, and components	335
Transportation equipment	336
Motor vehicles, trailers, and parts	3361+3362+3363
Aerospace products and parts	3364
Other transportation equipment	336 minus (3361+3362+3363+3364)
Furniture and related products	337
Miscellaneous manufacturing	339
Medical equipment and supplies	3391
Other miscellaneous manufacturing	339 minus 3391
Other manufacturing	(31+32+33) minus [(311 through 316)+(321 through 327)+(331 through 337)+339)]
NONMANUFACTURING INDUSTRIES	21+22+23+42+(44 through 81)
Mining, extraction, and support activities	21
Utilities	22
Construction	23
Trade	42+44+45
Transportation and warehousing	48+49

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[10] The 1997 version of NAICS was used for the 1999 survey.

Information	51
Publishing	511
Newspaper, periodical, book, and database	5111
Software	5112
Broadcasting and telecommunications	513
Radio and television broadcasting	5131
Telecommunications	5133
Other broadcasting and telecommunications	513 minus (5131+5133)
Other information	51 minus (511+513)
Finance, insurance, and real estate	52+53
Professional, scientific, and technical services	54
Architectural, engineering, and related services	5413
Computer systems design and related services	5415
Scientific R&D services	5417
Other professional, scientific, and technical services	54 minus (5413+5415+5417)
Management of companies and enterprises	55
Health care services	621+622+623
Other nonmanufacturing	56+61+624+71+72+81

PERCENTAGES

Percentages were calculated on the basis of thousands of dollars and may differ slightly from those calculated using the rounded figures shown.

REPORTING UNIT

The basic reporting unit was the company, firm, or enterprise that included all establishments under common ownership or control. All R&D expenditures and all information about scientists and engineers of each company were classified into a single NAICS code and size category.

ROUNDING

Because of rounding, details may not add to totals. Most money amounts are expressed in millions of dollars and are rounded down if less than $500,000[11] or up if $500,000 or more. Frequency estimates (e.g., number of companies) are accumulated from decimal weights assigned to company records (see section B) and are rounded down if less than 0.5 and rounded up if 0.5 or greater. Most employment counts (e.g., number of scientists and engineers) are expressed in thousands and are rounded down if less than 500 or up if 500 or greater.

ZEROES

Zeroes are shown in the tables when numerical values are accumulated from the statistical file to estimate a particular cell and the accumulated sum equals zero. This accumulated sum is sometimes referred to as a "true zero." In the cases where there were no numerical values to accumulate, the cell is filled with "—" indicating that data were not collected. For example, in table A-3, the 1999 cell for "other manufacturing" contains "—" because data were not collected for 1999 but were collected for 1997 and 1998 (the other two years shown in the table).[12]

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[11] For values less than $500,000, no estimate appears, but the cell is flagged with a footnote marker.

[12] For 1999, with the advent of NAICS, data for the "other manufacturing" classification were not collected because all of the possible NAICS manufacturing industry classifications are represented elsewhere in the industry stub. No doubt, in future years as NAICS is expanded, data will be collected for the "other manufacturing" classification.

Table A-1. **Trends in total (Federal plus company and other) funds for industrial R&D performance in the U.S., by source of funds, in current and in constant dollars: 1953-99**

Page 1 of 2

Year	Total R&D		Federal		Company[1]	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]					
1953	3,630	18,857	1,430	7,429	2,200	11,429
1954	4,070	20,936	1,750	9,002	2,320	11,934
1955	4,640	23,458	2,180	11,021	2,460	12,437
1956	6,605	32,298	3,328	16,274	3,277	16,024
1957	7,731	36,588	4,335	20,516	3,396	16,072
1958	8,389	38,766	4,759	21,992	3,630	16,774
1959	9,618	43,958	5,635	25,754	3,983	18,204
1960	10,509	47,359	6,081	27,404	4,428	19,955
1961	10,908	48,610	6,240	27,807	4,668	20,802
1962	11,464	50,413	6,434	28,294	5,029	22,115
1963	12,630	54,913	7,270	31,609	5,360	23,304
1964	13,512	57,892	7,720	33,076	5,792	24,816
1965	14,185	59,651	7,740	32,548	6,445	27,103
1966	15,548	63,565	8,332	34,064	7,216	29,501
1967	16,385	64,994	8,365	33,181	8,020	31,813
1968	17,429	66,270	8,560	32,548	8,869	33,722
1969	18,308	66,357	8,451	30,631	9,857	35,727
1970	18,067	62,171	7,779	26,769	10,288	35,403
1971	18,320	60,026	7,666	25,118	10,654	34,908
1972	19,552	61,446	8,017	25,195	11,535	36,251
1973	21,249	63,241	8,145	24,241	13,104	39,000
1974	22,887	62,499	8,220	22,447	14,667	40,052
1975	24,187	60,422	8,605	21,496	15,582	38,926
1976	26,997	63,823	9,561	22,603	17,436	41,220
1977	29,825	66,248	10,485	23,290	19,340	42,959
1978	33,304	69,052	11,189	23,199	22,115	45,853
1979	38,226	73,160	12,518	23,958	25,708	49,202
1980	44,505	78,024	14,029	24,595	30,476	53,429
1981	51,810	83,069	16,382	26,266	35,428	56,803
1982	58,650	88,528	18,545	27,992	40,105	60,536
1983	65,268	94,756	20,680	30,023	44,588	64,733
1984	74,800	104,703	23,396	32,749	51,404	71,954
1985	84,239	114,315	27,196	36,906	57,043	77,409
1986	87,823	116,615	27,891	37,035	59,932	79,580
1987	92,155	118,787	30,752	39,639	61,403	79,148
1988[2]	97,015	120,951	30,343	37,829	66,672	83,122
1989[2]	102,055	122,559	28,554	34,291	73,501	88,268
1990[2]	109,727	126,837	28,125	32,511	81,602	94,327
1991[2 3]	116,952	130,439	26,372	29,413	90,580	101,026
1992[3]	119,110	129,693	24,722	26,919	94,388	102,774
1993[3]	117,400	124,827	22,809	24,252	94,591	100,575
1994[3]	119,595	124,565	22,463	23,397	97,131	101,168

See explanatory information and SOURCE at end of table.

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Table A-1. **Trends in total (Federal plus company and other) funds for industrial R&D performance in the U.S., by source of funds, in current and in constant dollars: 1953-99**

Page 2 of 2

Year	Total R&D		Federal		Company [1]	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]					
1995 [3]	132,103	134,662	23,451	23,905	108,652	110,756
1996 [3]	144,667	144,667	23,653	23,653	121,015	121,015
1997 [3]	157,539	154,526	23,928	23,470	133,611	131,055
1998 [3]	169,180	163,902	24,164	23,410	145,016	140,492
1999 [3]	182,823	174,499	22,535	21,509	160,288	152,990

[1] The company-funded R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

[2] As a result of a new sample design, statistics for 1988-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries.

[3] As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years. See the technical notes for more information.

NOTE: Gross domestic product (GDP) implicit price deflators were used to convert current dollars to constant (1996) dollars.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-2. **Summary data for companies performing industrial R&D in the U.S., by industry and by size of company: 1998-99**

Page 1 of 3

Industry and size of company	NAICS codes	Research and development funds						Domestic net sales		R&D scientists and engineers		Domestic employment	
		Total		Federal		Company				January[2]		March	
		1998[1]	1999	1998[1]	1999	1998[1]	1999	1998[1]	1999	1999	2000	1998[1]	1999
		[In millions of dollars]								[In thousands]			
Distribution by industry:													
All industries	21-23, 31-33, 42, 44-81	169,180	182,823	24,164	22,535	145,016	160,288	4,683,335	5,856,396	997.7	1,033.7	18,289	22,935
Manufacturing[3]	31-33	--	116,921	--	17,055	--	99,865	--	3,126,793	--	596.7	--	10,930
Food	311	1,361	1,159	0	0	1,361	1,159	311,251	303,686	10.0	8.1	960	1,043
Beverage and tobacco products	312	386	(D)	0	0	386	(D)	64,412	52,984	(D)	1.9	117	77
Textiles, apparel, and leather	313-16	406	337	0	0	406	337	44,012	47,407	3.0	11.1	330	362
Wood products	321	265	70	5	0	260	70	14,717	13,772	3.0	0.7	80	71
Paper, printing and support activities	322, 323	(D)	(D)	(D)	(D)	1,664	2,496	166,181	173,124	(S) 13.0	(S) 13.5	716	688
Petroleum and coal products	324	1,395	615	5	(D)	1,390	(D)	176,147	157,630	5.0	3.0	189	116
Chemicals	325	19,145	20,372	236	194	18,908	20,178	309,144	396,513	85.0	84.9	931	1,023
Basic chemicals	3251	3,610	2,773	143	98	3,467	2,676	73,078	130,152	18.0	15.5	204	258
Resin, synthetic rubber, fibers, and filament	3252	(D)	(D)	(D)	(D)	2,004	2,216	51,938	52,526	7.0	8.0	125	124
Pharmaceuticals and medicines	3254	(D)	(D)	(D)	(D)	9,604	12,236	87,373	116,900	38.0	41.3	276	310
Other chemicals	325 (minus 3251-52, 3254)	(D)	(D)	(D)	(D)	3,833	3,050	96,755	96,936	21.0	20.1	327	331
Plastics and rubber products	326	1,803	1,845	101	0	1,701	1,845	83,600	93,057	13.0	14.0	553	562
Nonmetallic mineral products	327	983	(D)	(D)	(D)	(D)	611	43,802	41,315	4.0	3.8	228	222
Primary metals	331	(D)	470	(D)	12	588	457	108,791	110,440	(S) 5.0	(S) 5.0	397	368
Fabricated metal products	332	1,865	1,704	54	46	1,811	1,658	126,271	116,837	19.0	10.5	808	752
Machinery	333	(D)	6,327	(D)	(S) 411	6,026	5,916	191,355	179,375	53.0	56.0	978	913
Computer and electronic products	334	38,764	37,749	6,363	5,998	32,401	31,752	409,966	355,716	(S) 237.0	(S) 198.8	1,565	1,317
Computers and peripheral equipment	3341	(D)	(D)	(D)	(D)	8,327	4,126	116,038	64,016	44.0	21.3	282	167
Communications equipment	3342	9,101	6,081	518	206	8,583	5,875	88,358	51,428	(S) 77.0	(S) 46.6	331	203
Semiconductor and other electronic components	3344	9,209	10,827	59	77	9,149	10,750	105,691	129,096	(S) 47.0	(S) 53.8	393	381
Navigational, measuring, electromedical, and control instruments	3345	11,526	15,951	5,768	5,710	5,757	10,241	88,717	97,964	66.0	72.3	528	522
Other computer and electronic products	334 (minus 3341-42, 3344-45)	(D)	(D)	(D)	(D)	585	760	11,162	13,212	4.0	4.8	32	43
Electrical equipment, appliances, and components	335	2,313	(D)	141	(D)	2,172	3,967	88,714	165,773	13.0	25.5	417	658

See explanatory information and SOURCE at end of table.

Table A-2. **Summary data for companies performing industrial R&D in the U.S., by ind**

Industry and size of company	NAICS codes	Research and d		
		Total		Fed
		1998 [1]	1999	1998 [1]
Distribution by industry				
Transportation equipment	336	31,393	34,059	10,682
Motor vehicles, trailers, and parts	3361-63	(D)	18,274	(D)
Aerospace products and parts	3364	16,376	14,425	9,838
Other transportation equipment	336 (minus 3361-64)	(D)	1,359	(D)
Furniture and related products	337	211	251	0
Miscellaneous manufacturing	339	(D)	4,226	(D)
Medical equipment and supplies	3391	(D)	3,615	(D)
Other miscellaneous manufacturing	339 (minus 3391)	821	611	0
Other manufacturing [4]	31-33 (minus 311-16, 321-27, 331-37, 339)	(D)	--	0
Nonmanufacturing [1]	21-23, 42, 44-81	--	65,902	--
Mining, extraction, and support activities	21	(D)	(D)	(D)
Utilities	22	(D)	142	(D)
Construction	23	(D)	699	(D)
Trade	42, 44, 45	16,845	19,960	77
Transportation and warehousing	48, 49	253	466	0
Information	51	13,923	15,421	556
Publishing	511	9,930	11,335	67
Newspaper, periodical, book, and database	5111	340	371	0
Software	5112	9,590	10,964	67
Broadcasting and telecommunications	513	(D)	(D)	(D)
Radio and television broadcasting	5131	(D)	(D)	(D)
Telecommunications	5133	(D)	(D)	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	(D)	31	0
Other information	51 (minus 511, 513)	(D)	(D)	(D)
Finance, insurance, and real estate	52, 53	(D)	(D)	(D)
Professional, scientific, and technical services	54	18,264	23,640	5,250
Architectural, engineering, and related services	5413	3,334	4,124	1,865
Computer systems design and related services	5415	(D)	(D)	(D)
Scientific R&D services	5417	10,566	11,264	2,985
Other professional, scientific and technical services	54 (minus 5413, 5415, 5417)	(D)	(D)	(D)

See explanatory information and SOURCE at end of table.

ustry and by size of company: 1998-99

Page 2 of 3

evelopment funds			Domestic net sales		R&D scientists and engineers		Domestic employment	
leral	Company				January[2]		March	
1999	1998[1]	1999	1998[1]	1999	1999	2000	1998[1]	1999
[In millions of dollars]					[In thousands]			
10,074	20,711	23,985	871,948	814,873	(S) 143.0	(S) 139.4	2,455	2,159
241	13,798	18,033	625,235	611,608	65.0	76.0	1,421	1,186
9,117	6,538	5,309	228,250	163,567	(S) 76.0	(S) 55.3	916	768
716	375	643	18,463	39,697	2.0	8.1	117	205
0	211	251	23,415	34,549	(S) 2.0	2.7	173	248
31	4,250	4,195	62,016	69,743	15.0	17.8	329	351
26	3,429	3,589	36,495	43,071	10.0	12.9	181	208
5	821	606	25,522	26,672	5.0	4.9	149	143
--	(D)	--	2,340	--	(D)	--	12	--
5,479	--	60,423	--	2,729,604	--	437.1	--	12,004
(D)	458	2,352	52,168	124,380	3.0	5.6	111	358
17	177	126	183,600	194,395	1.0	0.7	413	410
2	450	697	17,608	41,395	9.0	8.3	105	270
96	16,769	19,864	343,603	361,790	90.0	125.2	1,486	1,339
0	253	466	73,024	88,184	1.0	4.8	678	756
497	13,367	14,925	300,846	433,614	105.0	114.2	1,333	1,665
49	9,863	11,286	74,699	84,438	74.0	79.7	364	348
0	340	371	26,185	19,028	4.0	3.2	140	124
49	9,523	10,915	48,514	65,410	69.0	76.5	224	223
(D)	1,788	1,393	204,697	323,069	14.0	15.7	804	1,153
(D)	(D)	(D)	(D)	(D)	(S) (D)	(D)	(D)	(D)
(D)	1,710	(D)	195,300	313,679	9.0	(D)	754	1,100
13	(D)	18	(D)	(D)	(D)	0.4	(D)	(D)
(D)	1,716	2,246	21,450	26,108	17.0	18.7	165	165
(D)	1,720	1,576	393,331	336,861	18.0	16.9	941	834
4,837	13,014	18,803	110,097	132,199	123.0	145.1	751	761
1,215	1,469	2,909	35,415	36,380	30.0	39.4	192	194
(D)	3,236	4,750	32,790	38,414	37.0	46.1	241	250
3,242	7,581	8,022	17,176	25,046	49.0	51.9	121	144
(D)	728	3,121	24,716	32,359	6.0	7.6	197	173

Table A-2. **Summary data for companies performing industrial R&D in the U.S., by indus**

Industry and size of company	NAICS codes	Research and dev		
		Total		Feder
		1998 [1]	1999	1998 [1]
Distribution by industry				
Management of companies and enterprises	55	417	(D)	0
Health care services	621-23	622	660	32
Other nonmanufacturing [4]	56, 61, 624, 71, 72, 81	2,151	902	29
[Number of employees]				
Total		169,180	182,823	24,164
5 to 24		4,943	7,004	638
25 to 49		3,323	4,750	466
50 to 99		6,415	7,225	581
100 to 249		8,681	7,213	1,186
250 to 499		6,814	7,892	565
500 to 999		5,495	7,032	363
1,000 to 4,999		21,525	24,840	620
5,000 to 9,999		14,053	16,376	536
10,000 to 24,999		24,876	24,922	955
25,000 or more		73,055	75,569	18,253

[1] The totals for "all industries" are identical to corresponding totals previously published using the Standard Industrial
Industry Classification System (NAICS) may not add to the totals. See the 'NOTE' below.

[2] Data recorded in January represent employment figures for the previous year.

[3] Manufacturing companies with at least 5 employees but with fewer than 50 employees and nonmanufacturing com
industry classification to minimize year-to-year variation in survey estimates. However, estimates for companies in
they are combined with estimates for companies in "small manufacturing companies" and "small nonmanufacturing

[4] Manufacturing companies in the 1998 sample that could not be classified with a NAICS code are included in "Othe
are included in "Other nonmanufacturing."

KEY (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
— = Indicates data not collected.

NOTE: Starting with the 1999 survey, estimates are based on the North American Industry Classification System
For this table, companies in the 1998 survey were assigned NAICS industry codes based on their SIC in
of the NAICS categories of industries in that year. They are included for comparison purposes only.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and

try and by size of company: 1998-99

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elopment funds			Domestic net sales		R&D scientists and engineers		Domestic employment	
al	Company				January[2]		March	
1999	1998[1]	1999	1998[1]	1999	1999	2000	1998[1]	1999
[In millions of dollars]					[In thousands]			
(D)	417	81	1,461	1,319	2.0	0.5	7	7
10	590	650	13,006	10,286	4.0	6.4	81	51
19	2,123	883	96,508	1,005,179	14.0	9.4	1,144	5,552
22,535	145,016	160,288	4,683,335	5,856,396	997.7	1,033.7	18,289	22,935
611	4,305	6,393	50,414	38,554	54.8	51.2	240	206
368	2,857	4,382	36,516	41,243	31.9	34.8	260	242
603	5,834	6,623	71,998	50,899	41.6	57.7	376	353
674	7,494	6,540	94,244	94,852	56.9	49.0	625	607
485	6,249	7,407	112,908	126,124	45.9	45.2	674	665
591	5,132	6,441	170,667	160,105	44.5	64.2	800	779
896	20,905	23,944	702,629	764,918	139.9	154.9	2,776	2,678
2,194	13,517	14,182	746,481	631,873	103.3	120.4	2,057	2,078
397	23,921	24,525	896,445	891,633	122.3	115.9	2,929	3,103
15,717	54,802	59,852	1,801,030	3,056,197	356.8	340.4	7,554	12,224

Classification (SIC) system. Detail published using the North American

panies with at least 5 employees but with fewer than 15 employees were sampled separately without regard to

these groups are included with their respective NAICS classification for this table. For other tables,

companies," respectively.

manufacturing"; nonmanufacturing companies that could not be classified with a NAICS code

(NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system

lustry codes. Consequently, the estimates for 1998 in this table are not necessarily representative

Development: 1999

Table A-3. **Total (Federal plus company and other) funds for Industrial R&D performance in the U.S., by industry and by size of company: 1997-99**

Page 1 of 3

Industry and size of company	NAICS codes		1997 [1]	1998 [1]	1999
			[In millions of dollars]		
Distribution by industry:					
All industries	21-23, 31-33, 42, 44-81		157,539	169,180	182,823
Manufacturing	31-33		–	–	116,921
Food	311		1,244	1,305	1,132
Beverage and tobacco products	312		447	384	(D)
Textiles, apparel, and leather	313-16		378	399	334
Wood products	321		26	60	70
Paper, printing and support activities	322, 323		(D)	(D)	(D)
Petroleum and coal products	324		(D)	1,395	615
Chemicals	325		16,492	18,969	20,246
Basic chemicals	3251		1,859	3,610	2,746
Resin, synthetic rubber, fibers, and filament	3252		(D)	(D)	(D)
Pharmaceuticals and medicines	3254		(D)	(D)	(D)
Other chemicals	325 (minus 3251-52, 3254)		(D)	(D)	(D)
Plastics and rubber products	326		1,484	1,625	1,785
Nonmetallic mineral products	327		548	558	(D)
Primary metals	331		992	(D)	470
Fabricated metal products	332		1,906	1,781	1,655
Machinery	333		5,610	(D)	6,057
Computer and electronic products	334		33,988	38,209	35,932
Computers and peripheral equipment	3341		(D)	(D)	(D)
Communications equipment	3342		2,930	8,974	6,003
Semiconductor and other electronic components	3344		(D)	9,131	10,701
Navigational, measuring, electromedical, and control instruments	3345		8,030	11,232	14,337
Other computer and electronic products	334 (minus 3341-42, 3344-45)		543	(D)	(D)
Electrical equipment, appliances, and components	335		2,741	2,280	(D)
Transportation equipment	336		34,422	31,359	33,965
Motor vehicles, trailers, and parts	3361-63		(D)	(D)	(D)
Aerospace products and parts	3364		17,865	16,359	14,425
Other transportation equipment	336 (minus 3361-64)		(D)	(D)	(D)
Furniture and related products	337		240	211	248
Miscellaneous manufacturing	339		3,457	(D)	3,851
Medical equipment and supplies	3391		3,041	(D)	(D)
Other miscellaneous manufacturing	339 (minus 3391)		416	525	(D)
Other manufacturing [2]	31-33 (minus 311-16, 321-27, 331-37, 339)	(S)	23	(D)	--
Small manufacturing companies [3]	Fewer than 50 employees		2,509	2,316	3,019

See explanatory information and SOURCE at end of table.

Table A-3. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and by size of company: 1997-99**

Page 2 of 3

Industry and size of company	NAICS codes	1997 [1]	1998 [1]	1999
		[In millions of dollars]		
Distribution by industry:				
Nonmanufacturing	21-23, 42, 44-81	--	--	65,902
Mining, extraction, and support activities	21	(D)	(D)	(D)
Utilities	22	(D)	(D)	142
Construction	23	241	(D)	691
Trade	42, 44, 45	(D)	16,492	19,616
Transportation and warehousing	48, 49	(D)	253	460
Information	51	10,595	13,581	15,389
Publishing	511	7,582	9,589	11,302
Newspaper, periodical, book, and database	5111	340	334	371
Software	5112	7,242	9,255	10,931
Broadcasting and telecommunications	513	(D)	(D)	(D)
Radio and television broadcasting	5131	(D)	(D)	(D)
Telecommunications	5133	(D)	(D)	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	12	(D)	31
Other information	51 (minus 511, 513)	(D)	(D)	(D)
Finance, insurance, and real estate	52, 53	(D)	(D)	(D)
Professional, scientific, and technical services	54	12,999	16,168	18,994
Architectural, engineering, and related services	5413	2,210	3,180	3,580
Computer systems design and related services	5415	(D)	(D)	(D)
Scientific R&D services	5417	7,023	9,062	10,470
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	(D)	(D)	(D)
Management of companies and enterprises	55	309	417	(D)
Health care services	621-23	639	617	642
Other nonmanufacturing [2]	56, 61, 624, 71, 72, 81	953	2,124	(D)
Small nonmanufacturing companies [3]	Fewer than 15 employees	(D)	2,849	5,203

See explanatory information and SOURCE at end of table.

Table A-3. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and by size of company: 1997-99**

Page 3 of 3

Industry and size of company		1997[1]	1998[1]	1999
		[In millions of dollars]		
Distribution by size of company: [Number of employees]				
Total		157,539	169,180	182,823
5 to 24		3,304	4,943	7,004
25 to 49		3,028	3,323	4,750
50 to 99		4,251	6,415	7,225
100 to 249		7,176	8,681	7,213
250 to 499		6,304	6,814	7,892
500 to 999		4,966	5,495	7,032
1,000 to 4,999		19,590	21,525	24,840
5,000 to 9,999		14,266	14,053	16,376
10,000 to 24,999		21,510	24,876	24,922
25,000 or more		73,144	73,055	75,569

[1] The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

[2] Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "Other manufacturing"; nonmanufacturing companies that could not be classified with a NAICS code are included in "Other nonmanufacturing."

[3] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed within company facilities funded from all sources. The funds are the company's own; funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments; and funds from the Federal Government. Excluded from this table are R&D not performed within the company (e.g., R&D contracted out to other organizations) and R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-4. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry, by size of company: 1999**

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Industry	NAICS codes	Size of company [number of employees]										
		Total	5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
		[In millions of dollars]										
Distribution by industry:												
All industries	21-23, 31-33, 42, 44-81	182,823	7,004	4,750	7,225	7,213	7,892	7,032	24,840	16,376	24,922	75,569
Manufacturing	31-33	116,921	738	(D)	2,183	2,623	2,190	3,763	15,561	(D)	(D)	60,163
Food	311	1,132	0	0	6	19	22	26	202	212	226	418
Beverage and tobacco products	312	(D)	0	0	0	0	0	0	13	(D)	0	(D)
Textiles, apparel, and leather	313-16	334	(D)	(D)	8	17	15	17	122	17	(S) 112	(D)
Wood products	321	70	(D)	0	(D)	(D)	0	1	29	(D)	(D)	0
Paper, printing and support activities	322, 323	(D)	(D)	0	0	8	17	49	105	36	476	(D)
Petroleum and coal products	324	615	0	0	30	0	(D)	(D)	(D)	(D)	(D)	(D)
Chemicals	325	20,246	(D)	52	61	(D)	(D)	305	3,111	2,168	(D)	(D)
Basic chemicals	3251	2,746	(D)	4	27	(D)	(D)	(S) 115	(D)	(D)	(D)	(D)
Resin, synthetic rubber, fibers, and filament	3252	(D)	0	0	(D)	0	(D)	0	(D)	(D)	(D)	(D)
Pharmaceuticals and medicines	3254	(D)	0	0	(D)	278	70	73	(D)	(D)	5,586	3,387
Other chemicals	325 (minus 3251-52, 3254)	(D)	0	49	(D)	119	26	116	411	(D)	961	(D)
Plastics and rubber products	326	1,785	(D)	0	23	97	232	81	367	313	270	(D)
Nonmetallic mineral products	327	(D)	0	0	2	15	6	(D)	69	152	(D)	0
Primary metals	331	470	4	0	8	(D)	11	31	94	(D)	(D)	(D)
Fabricated metal products	332	1,655	(D)	16	16	(D)	89	94	(D)	(D)	(D)	(D)
Machinery	333	6,057	63	33	54	296	(D)	(D)	(D)	(D)	(D)	(D)
Computer and electronic products	334	35,932	37	25	53	1,081	(D)	1,953	5,858	(D)	(D)	(D)
Computers and peripheral equipment	3341	(D)	0	2	15	(D)	244	(D)	334	(D)	(D)	(D)
Communications equipment	3342	6,003	0	(D)	0	458	(D)	(D)	(D)	(D)	(D)	(D)
Semiconductor and other electronic components	3344	10,701	37	(D)	37	277	466	(D)	(D)	1,281	2,169	(D)
Navigational, measuring, electromedical, and control instruments	3345	14,337	0	0	1	(D)	(D)	(D)	1,500	(D)	(D)	(D)
Other computer and electronic products	334 (minus 3341-42, 3344-45)	(D)	0	(D)	0	51	(D)	227	(D)	0	(D)	0
Electrical equipment, appliances, and components	335	(D)	2	(D)	(D)	80	(D)	(D)	402	224	548	(D)
Transportation equipment	336	33,965	(D)	29	(D)	(D)	4	223	2,761	1,410	(D)	28,237
Motor vehicles, trailers, and parts	3361-63	(D)	(D)	29	0	124	0	(D)	2,601	(D)	709	14,363
Aerospace products and parts	3364	14,425	0	0	(D)	(D)	0	(D)	71	(D)	(D)	(D)
Other transportation equipment	336 (minus 3361-64)	(D)	0	0	(D)	25	4	(D)	89	383	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-4. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry, by size of company: 1999**

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Industry	NAICS codes	Total	5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
		Size of company [number of employees] [In millions of dollars]										
Distribution by industry:												
Furniture and related products	337	248	0	0	4	17	5	3	50	85	84	0
Miscellaneous manufacturing	339	3,851	32	0	(D)	243	95	146	835	431	(D)	(D)
Medical equipment and supplies	3391	(D)	15	0	(D)	205	56	(D)	476	431	(D)	(D)
Other miscellaneous manufacturing	339 (minus 3391)	(D)	17	0	9	39	39	(D)	359	0	(D)	(D)
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies [1]	Fewer than 50 employees	3,019	(D)	(D)	1,789	(D)	(D)	(D)	(D)	0	0	0
Nonmanufacturing	21-23, 42, 44-81	65,902	6,265	(D)	5,042	4,591	5,701	3,269	9,278	(D)	(D)	15,406
Mining, extraction, and support activities	21	(D)	0	(D)	(D)	0	1,750	207	67	79	(D)	0
Utilities	22	142	0	0	0	0	0	(D)	(D)	53	55	(D)
Construction	23	691	0	6	393	5	6	(D)	(D)	(D)	0	(D)
Trade	42, 44, 45	19,616	72	387	323	627	(D)	(D)	(D)	2,021	(D)	(D)
Transportation and warehousing	48, 49	460	80	23	0	(D)	0	(D)	6	4	23	(D)
Information	51	15,389	354	(D)	644	956	(D)	(D)	(D)	1,568	(D)	(D)
Publishing	511	11,302	256	443	555	863	(D)	1,089	2,448	1,350	(D)	(D)
Newspaper, periodical, book, and database	5111	371	0	0	48	114	0	(D)	(D)	0	(D)	(D)
Software	5112	10,931	256	443	507	749	(D)	(D)	(D)	1,350	(D)	(D)
Broadcasting and telecommunications	513	(D)	0	1	13	21	0	(D)	(D)	0	(D)	(D)
Radio and television broadcasting	5131	(D)	0	1	0	(D)	0	0	(D)	0	0	(D)
Telecommunications	5133	(D)	0	0	0	(D)	0	(D)	(D)	0	(D)	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	31	0	0	13	11	0	(D)	0	0	(D)	(D)
Other information	51 (minus 511, 513)	(D)	98	(D)	76	72	354	82	(D)	218	(D)	962
Finance, insurance, and real estate	52, 53	(D)	44	(D)	(S) 11	(D)	149	29	(D)	285	324	494
Professional, scientific, and technical services	54	18,994	979	2,970	3,092	2,938	2,268	1,585	2,401	(D)	(D)	(D)
Architectural, engineering, and related services	5413	3,580	183	1,284	510	257	(D)	(D)	(D)	(D)	(D)	0
Computer systems design and related services	5415	(D)	364	(D)	725	587	(D)	305	806	383	0	(D)
Scientific R&D services	5417	10,470	418	1,158	1,597	2,051	1,272	1,075	(D)	(D)	0	(D)
Other professional, scientific and technical services	54 (minus 5413, 5415, 5417)	(D)	14	(D)	259	43	(D)	(D)	71	(D)	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-4. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry, by size of company: 1999**

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Industry	NAICS codes	Size of company [number of employees]										
		Total	5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
		[In millions of dollars]										
Distribution by industry												
Management of companies and enterprises	55	(D)	0	(D)	(D)	(D)	(D)	0	14	0	0	0
Health care services	621-23	642	32	61	(D)	0	12	0	0	0	(D)	0
Other nonmanufacturing	56, 61, 624, 71, 72, 81	(D)	50	2	77	25	(D)	(D)	143	19	(D)	201
Small nonmanufacturing companies [1]	Fewer than 15 employees	5,203	4,654	(D)	499	(D)	(D)	(D)	(D)	0	0	0

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. Note that because companies were assigned to the "small company" partition of the sample based on preliminary information available from the sampling frame and number of employees may have been revised during statistical processing, some companies' statistics are reported in size categories above the 50 employee threshold for manufacturing companies and the 15 employees threshold for nonmanufacturing companies. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY

(D) = Data have been withheld to avoid disclosing operations of individual companies.

(S) = Indicates imputation of more than 50 percent.

-- = Indicates data not collected.

NOTE: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-5. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by industry and by size of company, by size of total R&D program: 1999**

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Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of R&D Program: Less than $200,000		$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry													
All industries	21-23, 31-33, 42, 44-81	39,005	182,823	22,496	1,233	8,936	4,364	5,588	17,186	1,777	41,840	209	118,201
Manufacturing	31-33	18,059	116,921	10,748	582	4,452	1,996	1,917	6,071	807	21,228	135	87,044
Food	311	526	1,132	359	16	86	(D)	56	173	24	786	1	(D)
Beverage and tobacco products	312	6	(D)	0	0	0	0	56	13	2	(D)	1	(D)
Textiles, apparel, and leather	313-16	441	334	337	25	55	22	56	111	8	(S) 176	0	0
Wood products	321	145	70	103	5	30	11	56	(D)	2	(D)	0	0
Paper, printing and support activities	322, 323	195	(D)	104	8	22	11	56	151	17	(D)	3	(D)
Petroleum and coal products	324	61	615	0	0	49	30	56	10	5	135	3	439
Chemicals	325	847	20,246	223	20	242	115	265	688	86	2,899	31	16,524
Basic chemicals	3251	137	2,746	19	1	41	(D)	44	176	28	1,036	5	(D)
Resin, synthetic rubber, fibers, and filament	3252	14	(D)	0	0	0	0	0	0	10	301	4	(D)
Pharmaceuticals and medicines	3254	175	(D)	0	0	1	(D)	134	289	22	723	18	11,261
Other chemicals	325 (minus 3251-52, 3254)	522	(D)	204	18	201	(D)	88	223	26	839	4	(D)
Plastics and rubber products	326	679	1,785	210	16	234	117	206	495	27	(D)	2	(D)
Nonmetallic mineral products	327	237	(D)	148	8	69	23	10	34	9	244	1	(D)
Primary metals	331	208	470	133	15	21	13	42	128	11	(D)	1	(D)
Fabricated metal products	332	1,202	1,655	661	49	407	158	118	359	14	(D)	2	(D)
Machinery	333	1,466	6,057	866	43	291	158	231	868	68	(D)	11	(D)
Computer and electronic products	334	1,157	35,932	239	10	238	116	398	1,568	235	5,793	47	28,446
Computers and peripheral equipment	3341	120	(D)	0	0	27	14	58	245	30	(D)	5	(D)
Communications equipment	3342	163	6,003	0	0	12	4	90	342	55	1,269	6	4,389
Semiconductor and other electronic components	3344	441	10,701	143	7	101	64	114	(D)	65	1,821	18	(D)
Navigational, measuring, electromedical, and control instruments	3345	280	14,337	50	1	51	13	102	(D)	60	(D)	17	12,457
Other computer and electronic products	334 (minus 3341-42, 3344-45)	154	(D)	47	2	48	21	33	78	24	463	1	(D)
Electrical equipment, appliances, and components	335	384	(D)	105	4	116	55	130	417	29	(D)	4	(D)

See explanatory information and SOURCE at end of table

Table A-5. Total (Federal plus company and other) funds for industrial R&D performan by size of company, by size of total R&D program: 1999

Industry and size of company	NAICS codes	Total number of companies	Total amount
Distribution by industry			
Transportation equipment	336	450	33,965
Motor vehicles, trailers, and parts	3361-63	306	(D)
Aerospace products and parts	3364	24	14,425
Other transportation equipment	336 (minus 3361-64)	120	(D)
Furniture and related products	337	205	248
Miscellaneous manufacturing	339	549	3,851
Medical equipment and supplies	3391	264	(D)
Other miscellaneous manufacturing	339 (minus 3391)	284	(D)
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--
Small manufacturing companies [1]	Fewer than 50 employees	9,300	3,019
Nonmanufacturing	21-23, 42, 44-81	20,946	65,902
Mining, extraction, and support activities	21	217	(D)
Utilities	22	58	142
Construction	23	558	691
Trade	42, 44, 45	2,671	19,616
Transportation and warehousing	48, 49	127	460
Information	51	1,690	15,389
Publishing	511	1,302	11,302
Newspaper, periodical, book, and database	5111	155	371
Software	5112	1,147	10,931
Broadcasting and telecommunications	513	84	(D)
Radio and television broadcasting	5131	51	(D)
Telecommunications	5133	15	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	18	31
Other information	51 (minus 511, 513)	303	(D)
Finance, insurance, and real estate	52, 53	258	(D)

See explanatory information and SOURCE at end of table.

ce in the U.S. and number of companies that performed R&D in the U.S., by industry and

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Size of R&D Program									
ss than 00,000		$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
of es	Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
44	3	183	94	80	199	120	3,922	23	29,748
0	0	148	85	54	120	95	3,197	9	(D)
0	0	0	0	3	(S) 21	11	(S) 345	10	14,059
44	3	35	9	22	57	14	380	4	(D)
08	11	66	24	24	65	7	148	0	0
10	14	142	71	148	430	44	968	5	2,369
70	2	68	38	86	251	37	786	4	(D)
40	12	74	33	63	178	7	183	1	(D)
--	--	--	--	--	--	--	--	--	--
99	336	2,200	(D)	102	(D)	100	1,405	0	0
48	651	4,484	2,368	3,670	11,115	970	20,612	74	31,156
50	2	51	33	57	226	58	1,901	1	(D)
19	1	11	5	25	88	3	48	0	0
50	21	51	20	53	382	3	(D)	1	(D)
00	87	651	(D)	389	1,140	109	(D)	22	15,033
0	0	61	30	63	112	2	(D)	1	(D)
66	20	570	380	697	(D)	134	(D)	23	(D)
68	15	463	322	555	(D)	99	(D)	17	6,660
0	0	99	82	53	105	3	(S) 184	0	0
68	15	365	240	501	(D)	96	(D)	17	6,660
49	1	7	(D)	14	47	11	(D)	3	1,020
49	1	0	0	0	0	1	(D)	1	(D)
0	0	0	0	3	(D)	10	672	2	(D)
0	0	7	(D)	11	(D)	0	0	0	0
50	4	100	(D)	127	217	23	(D)	3	(D)
08	7	58	43	67	(D)	19	364	6	915

Table A-5. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by industry and by size of company, by size of total R&D program: 1999**

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Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of R&D Program: Less than $200,000		$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry													
Professional, scientific, and technical services	54	3,968	18,994	978	78	1,128	505	1,466	5,226	378	8,148	18	5,037
Architectural, engineering, and related services	5413	1,045	3,580	399	30	302	131	262	(D)	78	1,691	3	(D)
Computer systems design and related services	5415	1,653	(D)	401	34	545	261	631	1,779	73	(D)	4	591
Scientific R&D services	5417	913	10,470	53	4	128	70	504	2,146	218	(D)	11	(D)
Other professional, scientific, and technical services	54 minus (5413, 5415, 5417)	356	(D)	126	10	153	42	69	(D)	9	(D)	0	0
Management of companies and enterprises	55	28	(D)	14	1	3	1	10	(D)	1	(D)	0	0
Health care services	621-23	405	642	250	16	150	77	4	(D)	0	0	1	(D)
Other nonmanufacturing	56, 61, 624, 71, 72, 81	966	(D)	615	27	251	(D)	88	(D)	11	282	1	(D)
Small nonmanufacturing companies [1]	Fewer than 15 employees	10,002	5,203	7,499	392	1,500	892	752	1,383	252	2,537	0	0
Distribution by size of company [Number of employees]													
Total		39,005	182,823	22,496	1,233	8,936	4,364	5,588	17,186	1,777	41,840	209	118,201
5 to 24		18,355	7,004	13,444	685	3,580	1,755	1,077	1,986	254	2,577	0	0
25 to 49		6,749	4,750	3,749	212	2,267	1,111	666	2,216	68	1,212	0	0
50 to 99		5,102	7,225	2,726	(D)	1,086	527	1,094	3,816	195	(D)	0	0
100 to 249		4,083	7,213	1,664	(D)	1,109	523	1,127	3,390	183	(D)	0	0
250 to 499		1,788	7,892	642	40	303	154	643	1,955	197	5,316	4	427
500 to 999		1,118	7,032	193	19	311	139	426	1,451	182	(D)	5	(D)
1,000 to 4,999		1,157	24,840	45	4	243	132	370	1,605	446	(D)	54	(D)
5,000 to 9,999		288	16,376	18	2	24	15	75	401	130	4,384	40	11,575
10,000 to 24,999		198	24,922	14	1	8	5	48	179	77	2,720	51	22,015
25,000 or more		167	75,569	1	(D)	5	3	61	188	44	(D)	55	73,215

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTE Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-6. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies in manufacturing and nonmanufacturing industries that performed industrial R&D in the U.S., by size of company: 1999**

Size of company [Number of employees]	Total	Manufacturing	Nonmanufacturing
	Funds for industrial R&D [In millions of dollars]		
Total	182,823	116,921	65,902
5 to 24	7,004	738	6,265
25 to 49	4,750	791	3,959
50 to 99	7,225	2,183	5,042
100 to 249	7,213	2,623	4,591
250 to 499	7,892	2,190	5,701
500 to 999	7,032	3,763	3,269
1,000 to 4,999	24,840	15,561	9,278
5,000 to 9,999	16,376	10,893	5,483
10,000 to 24,999	24,922	18,014	6,908
25,000 or more	75,569	60,163	15,406
	Number of R&D-performing companies		
Total	39,005	18,059	20,946
5 to 24	18,355	5,750	12,606
25 to 49	6,749	3,707	3,042
50 to 99	5,102	2,644	2,457
100 to 249	4,083	2,840	1,243
250 to 499	1,788	975	813
500 to 999	1,118	890	228
1,000 to 4,999	1,157	865	292
5,000 to 9,999	288	194	94
10,000 to 24,999	198	129	69
25,000 or more	167	65	102

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-7. **Company and other non-Federal funds for industrial R&D performance in the U.S., by industry and by size of company: 1997-99**

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Industry and size of company	NAICS codes	1997 [1]	1998 [1]	1999
		[In millions of dollars]		
Distribution by industry:				
All industries	21-23, 31-33, 42, 44-81	133,611	145,016	160,288
Manufacturing	31-33	--	--	99,865
Food	311	1,244	1,305	1,132
Beverage and tobacco products	312	447	384	(D)
Textiles, apparel, and leather	313-16	378	399	334
Wood products	321	26	55	70
Paper, printing and support activities	322, 323	2,252	1,660	2,474
Petroleum and coal products	324	1,349	1,390	(D)
Chemicals	325	16,385	18,733	20,051
Basic chemicals	3251	1,840	3,467	2,648
Resin, synthetic rubber, fibers, and filament	3252	1,802	1,995	2,216
Pharmaceuticals and medicines	3254	10,213	9,601	12,236
Other chemicals	325 (minus 3251-52, 3254)	2,530	3,670	2,951
Plastics and rubber products	326	1,480	1,625	1,785
Nonmetallic mineral products	327	546	(D)	595
Primary metals	331	754	588	457
Fabricated metal products	332	1,854	1,727	1,608
Machinery	333	5,470	5,831	5,658
Computer and electronic products	334	29,697	31,873	29,939
Computers and peripheral equipment	3341	7,718	8,276	4,126
Communications equipment	3342	2,751	8,456	5,797
Semiconductor and other electronic components	3344	14,033	9,072	10,624
Navigational, measuring, electromedical, and control instruments	3345	4,659	5,483	8,632
Other computer and electronic products	334 (minus 3341-42, 3344-45)	537	585	760
Electrical equipment, appliances, and components	335	2,580	2,139	3,820
Transportation equipment	336	21,713	20,677	23,928
Motor vehicles, trailers, and parts	3361-63	14,340	13,781	17,987
Aerospace products and parts	3364	6,961	6,521	5,309
Other transportation equipment	336 (minus 3361-64)	412	375	632
Furniture and related products	337	240	211	248
Miscellaneous manufacturing	339	3,447	3,888	3,825
Medical equipment and supplies	3391	3,031	3,363	3,251
Other miscellaneous manufacturing	339 (minus 3391)	416	525	574
Other manufacturing [2]	31-33 (minus 311-16, 321-27, 331-37, 339)	(S) 23	(D)	--
Small manufacturing companies [3]	Fewer than 50 employees	2,357	2,188	2,950

See explanatory information and SOURCE at end of table.

Table A-7. Company and other non-Federal funds for industrial R&D performance in the U.S., by industry and by size of company: 1997-99

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Industry and size of company	NAICS codes	1997 [1]	1998 [1]	1999
		[In millions of dollars]		
Distribution by industry:				
Nonmanufacturing	21-23, 42, 44-81	–	–	60,423
Mining, extraction, and support activities	21	447	458	2,352
Utilities	22	209	177	126
Construction	23	241	445	690
Trade	42, 44, 45	15,862	16,415	19,521
Transportation and warehousing	48, 49	662	253	460
Information	51	10,191	13,025	14,892
Publishing	511	7,535	9,522	11,253
Newspaper, periodical, book, and database	5111	340	334	371
Software	5112	7,194	9,188	10,882
Broadcasting and telecommunications	513	2,139	1,788	1,393
Radio and television broadcasting	5131	(D)	(D)	(D)
Telecommunications	5133	(D)	1,710	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	12	(D)	18
Other information	51 (minus 511, 513)	518	1,716	2,246
Finance, insurance, and real estate	52, 53	1,326	1,700	1,570
Professional, scientific, and technical services	54	9,380	11,440	14,379
Architectural, engineering, and related services	5413	1,152	1,405	2,402
Computer systems design and related services	5415	2,995	2,861	3,989
Scientific R&D services	5417	4,688	6,446	7,413
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	(S) 544	728	575
Management of companies and enterprises	55	309	417	72
Health care services	621-23	635	584	631
Other nonmanufacturing [2]	56, 61, 624, 71, 72, 81	911	2,095	752
Small nonmanufacturing companies [3]	Fewer than 15 employees	1,569	2,327	4,977

See explanatory information and SOURCE at end of table.

Table A-7. **Company and other non-Federal funds for industrial R&D performance in the U.S., by industry and by size of company: 1997-99**

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Industry and size of company		1997[1]	1998[1]	1999
		[In millions of dollars]		
Distribution by size of company: [Number of employees]				
Total		133,611	145,016	160,288
5 to 24		2,836	4,305	6,393
25 to 49		2,745	2,857	4,382
50 to 99		3,819	5,834	6,623
100 to 249		6,606	7,494	6,540
250 to 499		5,848	6,249	7,407
500 to 999		4,590	5,132	6,441
1,000 to 4,999		19,049	20,905	23,944
5,000 to 9,999		13,655	13,517	14,182
10,000 to 24,999		20,597	23,921	24,525
25,000 or more		53,866	54,802	59,852

[1] The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

[2] Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "Other manufacturing"; nonmanufacturing companies that could not be classified with a NAICS code are included in "Other nonmanufacturing."

[3] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY:
(D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-8. **Company and other non-Federal funds for industrial R&D performance in the U.S., by industry, by size of company: 1999**

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
All industries	21-23, 31-33, 42, 44-81	160,288	6,393	4,382	6,623	6,540	7,407	6,441	23,944	14,182	24,525	59,852
Manufacturing	31-33	99,865	634	777	2,171	2,546	2,127	3,506	15,204	9,502	17,745	45,655
Food	311	1,132	0	0	6	19	22	26	202	212	226	418
Beverage and tobacco products	312	(D)	0	0	0	0	0	0	13	(D)	0	(D)
Textiles, apparel, and leather	313-16	334	(D)	(D)	8	17	15	17	122	17	(S) 112	(D)
Wood products	321	70	(D)	0	10	11	0	1	29	(D)	(D)	0
Paper, printing and support activities	322, 323	2,474	0	0	0	8	17	49	105	36	476	1,783
Petroleum and coal products	324	(D)	0	0	30	0	(D)	(D)	(D)	(D)	327	(D)
Chemicals	325	20,051	0	52	61	459	177	305	2,999	2,158	7,657	6,185
Basic chemicals	3251	2,648	0	4	26	62	70	(S) 115	631	244	(D)	(D)
Resin, synthetic rubber, fibers, and filament	3252	2,216	0	0	(D)	0	(D)	0	302	296	(D)	(D)
Pharmaceuticals and medicines	3254	12,236	0	0	(D)	278	(D)	73	1,655	1,169	5,586	3,387
Other chemicals	325 (minus 3251-52, 3254)	2,951	0	49	(D)	119	26	116	411	448	961	(D)
Plastics and rubber products	326	1,785	(D)	0	23	97	232	81	367	313	270	(D)
Nonmetallic mineral products	327	595	0	0	2	15	6	(D)	69	152	(D)	0
Primary metals	331	457	4	0	8	(D)	11	31	93	67	109	(D)
Fabricated metal products	332	1,608	9	16	16	(D)	66	94	162	222	298	(D)
Machinery	333	5,658	13	33	54	294	168	631	1,349	1,222	1,013	882
Computer and electronic products	334	29,939	37	25	53	1,026	1,194	1,817	5,621	3,532	5,095	11,539
Computers and peripheral equipment	3341	4,126	0	2	15	102	244	168	334	1,218	(D)	(D)
Communications equipment	3342	5,797	0	(D)	0	458	(D)	382	1,038	213	(D)	(D)
Semiconductor and other electronic components	3344	10,624	37	(D)	37	225	466	378	2,534	1,281	2,164	(D)
Navigational, measuring, electromedical, and control instruments	3345	8,632	0	0	1	190	257	662	1,285	820	875	4,543
Other computer and electronic products	334 (minus 3341-42, 3344-45)	760	0	(D)	0	51	(D)	227	430	0	0	0
Electrical equipment, appliances, and components	335	3,820	2	(D)	30	72	110	180	402	224	548	(D)

See explanatory information and SOURCE at end of table.

Table A-8. **Company and other non-Federal funds for industrial R&D performance in the**

Industry	NAICS codes	Total	5 to 24
Distribution by industry:			
Transportation equipment	336	23,928	0
Motor vehicles, trailers, and parts	3361-63	17,987	0
Aerospace products and parts	3364	5,309	0
Other transportation equipment	336 (minus 3361-64)	632	0
Furniture and related products	337	248	0
Miscellaneous manufacturing	339	3,825	32
Medical equipment and supplies	3391	3,251	15
Other miscellaneous manufacturing	339 (minus 3391)	574	17
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--
Small manufacturing companies	Fewer than 50 employees	2,950	533
Nonmanufacturing	21-23, 42, 44-81	60,423	5,759
Mining, extraction, and support activities	21	2,352	0
Utilities	22	126	0
Construction	23	690	0
Trade	42, 44, 45	19,521	72
Transportation and warehousing	48, 49	460	80
Information	51	14,892	352
Publishing	511	11,253	254
Newspaper, periodical, book, and database	5111	371	0
Software	5112	10,882	254
Broadcasting and telecommunications	513	1,393	0
Radio and television broadcasting	5131	(D)	0
Telecommunications	5133	(D)	0
Other broadcasting and telecommunications	513 (minus 5131, 5133)	18	0

See explanatory information and SOURCE at end of table.

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e U.S., by industry, by size of company: 1999

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Size of company [number of employees]								
25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In millions of dollars]								
29	(S) 1	148	4	129	2,759	739	1,063	19,058
29	0	124	0	46	2,599	(D)	709	(D)
0	(D)	0	0	(D)	71	305	(D)	4,741
0	(D)	25	4	(D)	89	(D)	(D)	(D)
0	4	17	5	3	50	85	84	0
0	76	239	95	125	835	431	(D)	(D)
0	67	200	56	60	476	431	(D)	(D)
0	9	39	39	65	359	0	(D)	(D)
--	--	--	--	--	--	--	--	--
616	1,789	4	(D)	(D)	(D)	0	0	0
3,605	4,452	3,994	5,280	2,935	8,740	4,680	6,780	14,197
(D)	(D)	0	1,750	207	67	79	243	0
0	0	0	0	(D)	12	49	55	(D)
6	393	5	6	(D)	(D)	(S) 45	0	(D)
387	297	626	483	203	3,605	2,021	1,560	10,268
23	0	(D)	0	(D)	6	4	23	(D)
(D)	629	944	921	1,181	2,769	1,568	(D)	2,273
431	553	850	568	(D)	(D)	1,350	(D)	(D)
0	48	114	0	(D)	(D)	0	(D)	(D)
431	505	736	568	1,076	2,340	1,350	(D)	(D)
1	0	21	0	(D)	(D)	0	(D)	1,272
1	0	(D)	0	0	(D)	0	0	(D)
0	0	(D)	0	(D)	(D)	0	(D)	1,244
0	0	11	0	(D)	0	0	(D)	(D)

Table A-8. **Company and other non-Federal funds for industrial R&D performance in the U.S., by industry, by size of company: 1999**

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Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In millions of dollars]									
Distribution by industry:												
Other information	51 (minus 511, 513)	2,246	98	(D)	76	72	354	82	(D)	218	(D)	(D)
Finance, insurance, and real estate	52, 53	1,570	44	(D)	(S) 11	(D)	149	29	228	285	324	494
Professional, scientific, and technical services	54	14,379	701	2,632	2,542	2,354	1,866	1,298	1,889	610	(D)	(D)
Architectural, engineering, and related services	5413	2,402	169	1,161	316	104	(D)	49	311	51	(D)	0
Computer systems design and related services	5415	3,989	275	453	635	567	583	(D)	791	383	0	(D)
Scientific R&D services	5417	7,413	243	992	1,332	1,640	1,106	932	(D)	(D)	0	(D)
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	575	14	26	259	43	(D)	(D)	(D)	(D)	(D)	(D)
Management of companies and enterprises	55	72	0	57	(D)	(D)	(D)	0	14	0	0	0
Health care services	621-23	631	32	59	(D)	0	(D)	0	0	0	(D)	0
Other nonmanufacturing	56, 61, 624, 71, 72, 81	752	50	2	77	25	82	(D)	143	19	(D)	201
Small nonmanufacturing companies [1]	Fewer than 15 employees	4,977	4,427	(D)	499	(D)	(D)	(D)	(D)	0	0	0

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. Note that because companies were assigned to the "small company" partition of the sample based on preliminary information available from the sampling frame and the number of employees may have been revised during statistical processing, some companies' statistics are reported in size categories above the 50 employee threshold for manufacturing companies and the 15 employee threshold for nonmanufacturing companies. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY
(D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

The R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999.

Table A-9. **Company and other non-Federal funds for industrial R&D performance in the U.S. and number of companies that performed company and other non-Federally funded R&D in the U.S., by industry and by size of company, by size of non-Federally funded R&D program: 1999**

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Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of R&D Program									
				Less than $200,000		$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
All industries	21-23, 31-33, 42, 44-81	37,799	160,288	21,764	1,216	8,599	4,006	5,483	15,826	1,743	39,621	209	99,619
Manufacturing	31-33	17,900	99,865	10,599	576	4,450	1,930	1,915	5,906	801	20,469	135	70,983
Food	311	526	1,132	359	16	86	(D)	56	173	24	786	1	(D)
Beverage and tobacco products	312	6	(D)	0	0	0	0	3	13	2	(D)	1	(D)
Textiles, apparel, and leather	313-16	441	334	337	25	55	22	41	111	8	(S) 176	0	0
Wood products	321	142	70	100	5	30	11	9	(D)	2	(D)	0	0
Paper, printing and support activities	322, 323	195	2,474	104	8	22	11	49	151	17	507	3	1,796
Petroleum and coal products	324	61	(D)	0	0	49	30	5	10	5	135	3	(D)
Chemicals	325	843	20,051	223	20	240	(D)	265	(D)	84	2,780	31	16,451
Basic chemicals	3251	133	2,648	19	1	39	(D)	44	(D)	27	(D)	5	1,496
Resin, synthetic rubber, fibers, and filament	3252	14	2,216	0	0	0	0	0	0	10	301	4	1,915
Pharmaceuticals and medicines	3254	174	12,236	0	0	1	(D)	134	289	21	(D)	18	11,261
Other chemicals	325 (minus 3251-52, 3254)	522	2,951	204	18	201	(D)	88	223	26	(D)	4	1,780
Plastics and rubber products	326	679	1,785	210	16	234	117	206	495	27	(D)	2	(D)
Nonmetallic mineral products	327	237	595	148	8	69	23	10	34	9	(D)	1	(D)
Primary metals	331	208	457	133	15	21	13	42	124	11	(D)	1	(D)
Fabricated metal products	332	1,201	1,608	661	49	407	158	117	331	14	(D)	2	(D)
Machinery	333	1,420	5,658	820	42	291	158	231	816	68	1,940	11	2,702
Computer and electronic products	334	1,156	29,939	239	10	238	115	398	1,512	234	5,379	47	22,923
Computers and peripheral equipment	3341	120	4,126	0	0	27	14	58	245	30	800	5	3,067
Communications equipment	3342	162	5,797	0	0	12	4	90	342	54	(D)	6	(D)
Semiconductor and other electronic components	3344	441	10,624	143	7	101	63	114	418	65	1,806	18	8,331
Navigational, measuring, electromedical, and control instruments	3345	280	8,632	50	1	51	13	102	428	60	1,137	17	7,053
Other computer and electronic products	334 (minus 3341-42, 3344-45)	154	760	47	2	48	21	33	78	24	(D)	1	(D)

See explanatory information and SOURCE at end of table

Table A-9. **Company and other non-Federal funds for industrial R&D performance in the U.S. and number of companies that performed company and other non-Federally funded R&D in the U.S., by industry and by size of company, by size of non-Federally funded R&D program: 1999**

Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of R&D Program									
				Less than $200,000		$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:													
Electrical equipment, appliances, and components	335	384	3,820	105	4	116	55	130	405	29	813	4	2,544
Transportation equipment	336	446	23,928	44	3	183	94	79	(D)	117	(D)	23	19,895
Motor vehicles, trailers, and parts	3361-63	306	17,987	0	0	148	85	54	120	95	3,179	9	14,603
Aerospace products and parts	3364	23	5,309	0	0	0	0	2	(D)	11	(D)	10	5,005
Other transportation equipment	336 (minus 3361-64)	116	632	44	3	35	9	22	57	10	277	4	287
Furniture and related products	337	205	248	108	11	66	24	24	65	7	148	0	0
Miscellaneous manufacturing	339	549	3,825	210	14	142	71	148	(D)	44	946	5	(D)
Medical equipment and supplies	3391	264	3,251	70	2	68	38	86	(D)	37	764	4	(D)
Other miscellaneous manufacturing	339 (minus 3391)	284	574	140	12	74	33	63	(D)	7	183	1	(D)
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	–	–	–	–	–	–	–	–	–	–	–	–
Small manufacturing companies [1]	Fewer than 50 employees	9,200	2,950	6,799	332	2,200	873	102	340	100	1,405	0	0
Nonmanufacturing	21-23, 42, 44-81	19,899	60,423	11,166	640	4,150	2,076	3,568	9,920	942	19,152	74	28,636
Mining, extraction, and support activities	21	217	2,352	50	2	51	33	57	226	58	(D)	1	(D)
Utilities	22	57	126	18	1	11	5	25	(D)	3	(D)	0	0
Construction	23	558	690	450	21	51	20	53	(D)	3	(S) 45	1	(D)
Trade	42, 44, 45	2,621	19,521	1,500	87	601	248	389	1,138	109	3,036	22	15,013
Transportation and warehousing	48, 49	127	460	0	0	61	30	63	112	2	(D)	1	(D)
Information	51	1,678	14,892	266	20	570	378	685	1,946	134	4,079	23	8,469
Publishing	511	1,300	11,253	168	15	463	320	553	1,695	99	2,563	17	6,660
Newspaper, periodical, book, and database	5111	155	371	0	0	99	82	53	105	3	(S) 184	0	0
Software	5112	1,145	10,882	168	15	365	238	499	1,590	96	2,379	17	6,660

See explanatory information and SOURCE at end of table.

Table A-9. **Company and other non-Federal funds for industrial R&D performance in the U.S. and number of companies that performed company and other non-Federally funded R&D in the U.S., by industry and by size of company, by size of non-Federally funded R&D program: 1999**

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Industry and size of company	NAICS codes	Total number of companies	Total amount	Size of R&D Program: Less than $200,000: Number of companies	Less than $200,000: Amount [In millions of dollars]	$200,000 to $999,999: Number of companies	$200,000 to $999,999: [In millions of dollars]	$1 million to $9.9 million: Number of companies	$1 million to $9.9 million: Amount [In millions of dollars]	$10 million to $99.9 million: Number of companies	$10 million to $99.9 million: Amount [In millions of dollars]	$100 million or more: Number of companies	$100 million or more: Amount [In millions of dollars]
Distribution by industry:													
Broadcasting and telecommunications	513	75	1,393	49	1	7	(D)	5	34	11	(D)	3	(D)
Radio and television broadcasting	5131	51	(D)	49	1	0	0	0	0	1	(D)	1	(D)
Telecommunications	5133	15	(D)	0	0	0	0	3	(D)	10	672	2	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	9	18	0	0	7	(D)	2	(D)	0	0	0	0
Other information	51 (minus 511, 513)	303	2,246	50	4	100	(D)	127	217	23	(D)	3	(D)
Finance, insurance, and real estate	52, 53	258	1,570	108	7	58	43	67	242	19	364	6	915
Professional, scientific, and technical services	54	3,786	14,379	946	74	1,094	462	1,377	4,099	350	6,771	18	2,973
Architectural, engineering, and related services	5413	1,016	2,402	396	30	290	114	252	659	75	1,284	3	316
Computer systems design and related services	5415	1,568	3,989	374	30	534	254	584	1,555	72	1,559	4	591
Scientific R&D services	5417	847	7,413	51	4	117	52	473	1,590	194	3,700	11	2,066
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	355	575	126	10	153	42	68	295	9	228	0	0
Management of companies and enterprises	55	28	72	14	1	3	1	10	(D)	1	(D)	0	0
Health care services	621-23	354	631	200	14	150	77	3	(D)	0	0	1	(D)
Other nonmanufacturing	56, 61, 624, 71, 72, 81	964	752	615	27	250	108	87	243	11	(D)	1	(D)
Small nonmanufacturing companies [1]	Fewer than 15 employees	9,253	4,977	6,999	387	1,250	670	752	1,383	252	2,537	0	0

See explanatory information and SOURCE at end of table.

Table A-9. **Company and other nonfederal funds for industrial R&D performance in the U.S. and number of companies that performed company and other non-Federally funded R&D in the U.S., by industry and by size of company, by size of non-Federally funded R&D program: 1999**

Page 4 of 4

Industry and size of company		Total number of companies	Total amount	Size of R&D Program									
				Less than $200,000		$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
				Number of companies	Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by size of company[1] [Number of employees]													
Total		37,799	160,288	21,764	1,216	8,599	4,006	5,483	15,826	1,743	39,621	209	99,619
5 to 24		17,429	6,393	12,816	673	3,324	1,455	1,034	1,688	254	2,577	0	0
25 to 49		6,666	4,382	3,698	209	2,256	1,092	644	1,886	68	1,194	0	0
50 to 99		5,010	6,623	2,726	155	1,023	494	1,072	3,393	189	2,581	0	0
100 to 249		4,009	6,540	1,615	113	1,104	519	1,121	3,178	169	2,729	0	0
250 to 499		1,773	7,407	639	40	301	153	635	1,890	194	4,898	4	427
500 to 999		1,108	6,441	193	19	311	138	424	1,439	175	3,941	5	905
1,000 to 4,999		1,152	23,944	44	4	243	132	369	1,591	443	12,590	54	9,627
5,000 to 9,999		288	14,182	18	2	24	15	75	394	130	4,284	40	9,487
10,000 to 24,999		198	24,525	14	1	8	5	48	179	77	2,680	51	21,659
25,000 or more		167	59,852	1	0	5	3	61	188	44	2,146	55	57,516

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; are included in manufacturing, nonmanufacturing, detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTE Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

The R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-10. **Company and other non-Federal funds for industrial R&D performance in the U.S. contracted to outside organizations and number of R&D-performing companies that contracted out performance of company-funded R&D, by industry and by size of company: 1997-99**

Industry and size of company	NAICS codes	1997 [1]		1998 [1]		1999	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by industry:							
All industries	21-23, 31-33, 42, 44-81	3,342	6,000	3,053	6,710	4,243	9,240
Manufacturing	31-33	--	--	--	--	1,720	4,080
Food	311	133	21	26	19	82	13
Beverage and tobacco products	312	1	(D)	1	(D)	1	(D)
Textiles, apparel, and leather	313-16	38	10	15	2	73	5
Wood products	321	6	(S) 7	1	(D)	6	(D)
Paper, printing and support activities	322, 323	13	(D)	33	10	6	(D)
Petroleum and coal products	324	21	(D)	51	21	2	(D)
Chemicals	325	110	1,886	176	2,181	167	2,386
Basic chemicals	3251	9	8	57	16	16	(D)
Resin, synthetic rubber, fibers, and filament	3252	5	36	6	28	4	(D)
Pharmaceuticals and medicines	3254	72	1,798	67	1,861	14	2,274
Other chemicals	325 (minus 3251-52, 3254)	24	44	45	276	132	57
Plastics and rubber products	326	74	34	78	39	21	33
Nonmetallic mineral products	327	8	(D)	11	(D)	52	10
Primary metals	331	15	8	45	81	10	2
Fabricated metal products	332	145	59	149	13	49	10
Machinery	333	74	126	236	161	173	151
Computer and electronic products	334	260	326	164	319	104	101
Computers and peripheral equipment	3341	7	54	15	64	9	24
Communications equipment	3342	58	(D)	8	(D)	4	(D)
Semiconductor and other electronic components	3344	125	180	91	61	76	33
Navigational, measuring, electromedical, and control instruments	3345	66	29	45	28	15	12
Other computer and electronic products	334 (minus 3341-42, 3344-45)	5	(D)	6	(D)	1	(D)
Electrical equipment, appliances, and components	335	68	7	11	3	42	(D)
Transportation equipment	336	69	792	18	919	64	812
Motor vehicles, trailers, and parts	3361-63	62	(D)	10	(D)	54	(D)
Aerospace products and parts	3364	6	(D)	7	148	4	80
Other transportation equipment	336 (minus 3361-64)	1	(D)	1	(D)	5	(D)
Furniture and related products	337	1	(D)	2	(D)	13	1
Miscellaneous manufacturing	339	62	43	50	15	56	18

See explanatory information and SOURCE at end of table.

Table A-10. **Company and other non-Federal funds for industrial R&D perform**
of R&D-performing companies that contracted out performance of company-

Industry and size of company	NAICS codes	Num com
Distribution by industry		
Medical equipment and supplies	3391	
Other miscellaneous manufacturing	339 (minus 3391)	
Other manufacturing [2]	31-33 (minus 311-16, 321-27, 331-37, 339)	
Small manufacturing companies [3]	Fewer than 50 employees	
Nonmanufacturing	21-23, 42, 44-81	
Mining, extraction, and support activities	21	
Utilities	22	
Construction	23	
Trade	42, 44, 45	
Transportation and warehousing	48, 49	
Information	51	
Publishing	511	
Newspaper, periodical, book, and database	5111	
Software	5112	
Broadcasting and telecommunications	513	
Radio and television broadcasting	5131	
Telecommunications	5133	
Other broadcasting and telecommunications	513 (minus 5131, 5133)	
Other information	51 (minus 511, 513)	
Finance, insurance, and real estate	52, 53	
Professional, scientific, and technical services	54	
Architectural, engineering, and related services	5413	
Computer systems design and related services	5415	
Scientific R&D services	5417	
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	
Management of companies and enterprises	55	
Health care services	621-23	
Other nonmanufacturing	56, 61, 624, 71, 72, 81	
Small nonmanufacturing companies [3]	Fewer than 15 employees	

See explanatory information and SOURCE at end of table.

mance in the U.S. contracted to outside organizations and number -funded R&D, by industry and by size of company: 1997-99

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1997 [1]		1998 [1]		1999	
mber of mpanies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
58	42	17	14	25	8
4	1	33	1	31	10
2	(D)	3	(D)	--	--
857	116	671	30	800	181
--	--	--	--	2,523	5,160
8	16	5	(D)	4	6
68	199	90	165	39	227
52	8	1	(D)	1	(D)
235	869	296	951	479	1,805
103	70	8	10	12	8
199	295	139	336	165	504
134	132	134	163	141	(D)
4	12	9	25	2	(D)
130	119	125	138	139	181
52	(D)	4	(D)	10	(D)
0	0	0	0	0	0
52	(D)	4	(D)	3	(D)
0	0	0	0	7	0
13	(D)	1	(D)	15	69
130	183	125	305	66	328
422	513	383	772	394	957
42	11	11	9	137	(D)
116	44	179	77	79	51
158	431	171	646	174	832
106	26	22	41	4	(D)
2	(D)	0	0	2	(D)
5	(D)	7	(D)	3	(D)
110	8	18	38	108	6
51	18	240	13	1,250	1 112

Table A-10. **Company and other non-Federal funds for industrial R&D performance in the U.S. contracted to outside organizations and number of R&D-performing companies that contracted out performance of company-funded R&D, by industry and by size of company: 1997-99**

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Industry and size of company		1997 [1]		1998 [1]		1999	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by size of company [Number of employees]							
Total		3,342	6,000	3,053	6,710	4,243	9,240
5 to 24		935	70	673	40	1,938	1,214
25 to 49		583	175	707	305	760	233
50 to 99		407	201	426	201	543	319
100 to 249		494	230	553	184	423	292
250 to 499		310	123	198	275	196	148
500 to 999		151	220	169	138	85	94
1,000 to 4,999		227	984	191	1,214	167	1,168
5,000 to 9,999		111	992	65	589	61	1,087
10,000 to 24,999		48	1,031	44	1,318	38	1,557
25,000 or more		75	1,974	27	2,446	33	3,128

[1] The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the "NOTES" below.

[2] Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "Other manufacturing"; nonmanufacturing companies that could not be classified with a NAICS code are included in "Other nonmanufacturing."

[3] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY:
(D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed outside company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table is company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-11. **Company and other non-Federal funds for industrial R&D perform performed industrial R&D both within and outside of the U.S., by industry an**

Industry and size of company	NAICS codes	Num comp
Distribution by industry:		
All industries	21-23, 31-33, 42, 44-81	
Manufacturing	31-33	
Food	311	
Beverage and tobacco products	312	
Textiles, apparel, and leather	313-16	
Wood products	321	
Paper, printing and support activities	322, 323	
Petroleum and coal products	324	
Chemicals	325	
Basic chemicals	3251	
Resin, synthetic rubber, fibers, and filament	3252	
Pharmaceuticals and medicines	3254	
Other chemicals	325 (minus 3251-52, 3254)	
Plastics and rubber products	326	
Nonmetallic mineral products	327	
Primary metals	331	
Fabricated metal products	332	
Machinery	333	
Computer and electronic products	334	
Computers and peripheral equipment	3341	
Communications equipment	3342	
Semiconductor and other electronic components	3344	
Navigational, measuring, electromedical, and control instruments	3345	
Other computer and electronic products	334 (minus 3341-42, 3344-45)	
Electrical equipment, appliances, and components	335	
Transportation equipment	336	
Motor vehicles, trailers, and parts	3361-63	
Aerospace products and parts	3364	
Other transportation equipment	336 (minus 3361-64)	
Furniture and related products	337	
Miscellaneous manufacturing	339	
Medical equipment and supplies	3391	
Other miscellaneous manufacturing	339 (minus 3391)	

See explanatory information and SOURCE at end of table.

ance outside of the U.S. and number of companies with subsidiaries that d by size of company: 1997-99

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1997 [1]		1998 [1]		1999	
ber of panies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
1,120	13,107	1,972	16,008	1,261	16,765
--	--	--	--	747	12,354
18	104	11	131	9	87
1	(D)	1	(D)	1	(D)
4	8	11	11	7	(D)
2	0	0	0	1	(D)
11	(D)	12	51	11	(D)
5	63	4	20	3	(D)
67	2,609	110	2,635	105	3,243
19	(D)	16	(D)	15	(D)
4	(D)	7	(D)	7	(D)
20	2,125	67	1,591	64	2,832
24	191	21	678	18	95
50	186	26	188	42	172
14	19	8	47	5	40
7	10	16	23	5	7
31	94	42	138	42	75
84	609	93	741	70	707
123	1,884	133	1,585	177	1,902
14	(S) 343	18	424	12	289
21	346	22	478	22	(D)
32	937	42	(D)	98	302
54	(D)	49	375	42	1,112
2	(D)	2	(D)	2	(D)
48	221	73	109	33	433
31	3,203	27	4,273	90	3,933
20	(D)	16	(D)	64	(D)
6	198	6	335	6	(D)
5	(D)	5	(D)	20	17
2	(D)	2	(D)	2	(D)
36	896	32	790	47	963
26	(D)	24	(D)	38	(D)
10	(D)	8	(D)	8	(D)

Table A-11. **Company and other non-Federal funds for industrial R&D perfo**
performed industrial R&D both within and outside of the U.S., by industry

Industry and size of company	NAICS codes
Distribution by industry:	
Other manufacturing [2]	31-33 (minus 311-16, 321-27, 331-37, 339)
Small manufacturing companies [3]	Fewer than 50 employees
Nonmanufacturing	21-23, 42, 44-81
Mining, extraction, and support activities	21
Utilities	22
Construction	23
Trade	42, 44, 45
Transportation and warehousing	48, 49
Information	51
Publishing	511
Newspaper, periodical, book, and database	5111
Software	5112
Broadcasting and telecommunications	513
Radio and television broadcasting	5131
Telecommunications	5133
Other broadcasting and telecommunications	513 (minus 5131, 5133)
Other information	51 (minus 511, 513)
Finance, insurance, and real estate	52, 53
Professional, scientific, and technical services	54
Architectural, engineering, and related services	5413
Computer systems design and related services	5415
Scientific R&D services	5417
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)
Management of companies and enterprises	55
Health care services	621-23
Other nonmanufacturing [2]	56, 61, 624, 71, 72, 81
Small nonmanufacturing companies [3]	Fewer than 15 employees

See explanatory information and SOURCE at end of table.

rmance outside of the U.S. and number of companies with subsidiaries that and by size of company: 1997-99

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1997[1]		1998[1]		1999	
Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
1	(D)	2	(D)	0	0
1	(D)	190	3	100	20
--	--	--	--	513	4,411
6	36	6	59	52	48
1	(D)	1	(D)	0	0
2	(D)	4	18	1	(D)
103	1,639	242	3,157	93	2,356
0	0	1	(D)	0	0
97	709	136	1,322	108	1,379
87	(D)	127	(D)	101	637
1	(D)	1	(D)	0	0
86	625	126	675	101	637
2	(D)	2	(D)	1	(D)
0	0	0	0	0	0
2	(D)	2	(D)	1	(D)
0	0	0	0	0	0
9	57	7	(D)	6	(D)
3	(D)	4	(D)	3	(D)
115	164	243	384	196	523
8	11	7	(D)	47	(D)
52	63	145	105	67	146
51	67	89	258	81	287
3	23	1	(D)	1	(D)
2	(D)	0	0	2	18
2	(D)	2	(D)	2	(D)
10	(S) 61	60	141	55	14
242	22	481	54	2	(D)

Table A-11. **Company and other non-Federal funds for industrial R&D performance outside of the U.S. and number of companies with subsidiaries that performed industrial R&D both within and outside of the U.S., by industry and by size of company: 1997-99**

Page 3 of 3

Industry and size of company		1997 [1]		1998 [1]		1999	
		Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
Distribution by size of company [Number of employees]							
Total		1,120	13,107	1,972	16,008	1,261	16,765
5 to 24		243	33	583	65	46	1
25 to 49		6	2	321	141	51	14
50 to 99		157	68	163	45	231	117
100 to 249		129	108	226	258	264	140
250 to 499		93	114	126	159	144	243
500 to 999		83	205	131	172	156	860
1,000 to 4,999		236	2,057	242	2,080	204	2,099
5,000 to 9,999		79	1,352	86	1,009	81	1,188
10,000 to 24,999		57	2,632	56	3,381	48	2,965
25,000 or more		36	6,537	38	8,700	35	9,138

[1] The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the "NOTES" below.

[2] Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "Other manufacturing"; nonmanufacturing companies that could not be classified with a NAICS code are included in "Other nonmanufacturing."

[3] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY:
(D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed outside company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table is company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-12. **Company and other non-Federal funds for industrial R&D performance outside of the U.S. and number of companies with subsidiaries that performed industrial R&D both within and outside the U.S., by location of R&D performance (country): 1999**

Location of R&D performance (country)	Number of companies [1]	Total [In millions of dollars]
Distribution by country:		
Total	1,261	16,765
Canada	131	862
Germany	128	3,542
France	105	1,128
Japan	88	1,049
United Kingdom	191	1,541
Puerto Rico	22	143
Other countries	240	2,572
Undistributed [2]	965	5,927

[1] Detail does not add to total because categories are not mutually exclusive.

[2] Includes data reported on Form RD-1 that were not allocated to a specific country, and total foreign R&D reported on Form RD-1A. Form RD-1A does not collect data by country.

NOTES: Data are reported in current U.S. dollars.

The R&D in this table is the industrial R&D performed outside the U.S. by a company's foreign subsidiaries or other foreign organizations funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table is company-funded R&D performed in the U.S. (e.g., R&D performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-13. **Federal funds for industrial R&D performance in the U.S., by industry and by size of company: 1997-99**

Page 1 of 3

Industry and size of company	NAICS codes	1997[1]	1998[1]	1999
		[In millions of dollars]		
Distribution by industry:				
All industries	21-23, 31-33, 42, 44-81	23,928	24,164	22,535
Manufacturing	31-33	--	--	17,055
Food	311	0	0	0
Beverage and tobacco products	312	0	0	0
Textiles, apparel, and leather	313-16	0	0	0
Wood products	321	0	5	0
Paper, printing and support activities	322, 323	(D)	(D)	(D)
Petroleum and coal products	324	(D)	5	(D)
Chemicals	325	107	236	194
Basic chemicals	3251	19	143	98
Resin, synthetic rubber, fibers, and filament	3252	(D)	(D)	(D)
Pharmaceuticals and medicines	3254	(D)	(D)	(D)
Other chemicals	325 (minus 3251-52, 3254)	(D)	(D)	(D)
Plastics and rubber products	326	(S) 4	0	0
Nonmetallic mineral products	327	2	(D)	(D)
Primary metals	331	238	(D)	12
Fabricated metal products	332	53	54	46
Machinery	333	141	(D)	(S) 399
Computer and electronic products	334	4,291	6,336	5,993
Computers and peripheral equipment	3341	(D)	(D)	(D)
Communications equipment	3342	180	518	206
Semiconductor and other electronic components	3344	(D)	59	77
Navigational, measuring, electromedical, and control instruments	3345	3,371	5,749	5,705
Other computer and electronic products	334 (minus 3341-42, 3344-45)	6	(D)	(D)
Electrical equipment, appliances, and components	335	160	141	(D)
Transportation equipment	336	12,709	10,682	10,037
Motor vehicles, trailers, and parts	3361-63	(D)	(D)	(D)
Aerospace products and parts	3364	10,904	9,838	9,117
Other transportation equipment	336 (minus 3361-64)	(D)	(D)	(D)
Furniture and related products	337	0	0	0
Miscellaneous manufacturing	339	10	(D)	26
Medical equipment and supplies	3391	10	(D)	(D)
Other miscellaneous manufacturing	339 (minus 3391)	0	0	(D)
Other manufacturing[2]	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--
Small manufacturing companies[3]	Fewer than 50 employees	151	128	69

See explanatory information and SOURCE at end of table.

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Table A-13. **Federal funds for industrial R&D performance in the U.S., by industry and by size of company: 1997-99**

Page 2 of 3

Industry and size of company	NAICS codes	1997 [1]	1998 [1]	1999
		[In millions of dollars]		
Distribution by industry:				
Nonmanufacturing	21-23, 42, 44-81	--	--	5,479
Mining, extraction, and support activities	21	(D)	(D)	(D)
Utilities	22	(D)	(D)	17
Construction	23	1	(D)	2
Trade	42, 44, 45	(D)	(S) 77	95
Transportation and warehousing	48, 49	(D)	0	0
Information	51	404	556	497
Publishing	511	47	67	49
Newspaper, periodical, book, and database	5111	0	0	0
Software	5112	47	67	49
Broadcasting and telecommunications	513	(D)	(D)	(D)
Radio and television broadcasting	5131	(D)	(D)	(D)
Telecommunications	5133	(D)	(D)	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	0	0	13
Other information	51 (minus 511, 513)	(D)	(D)	(D)
Finance, insurance, and real estate	52, 53	(D)	(D)	(D)
Professional, scientific, and technical services	54	3,620	4,728	4,615
Architectural, engineering, and related services	5413	1,058	1,775	1,177
Computer systems design and related services	5415	(D)	(D)	(D)
Scientific R&D services	5417	(S) 2,334	(S) 2,615	3,057
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	(D)	(D)	(D)
Management of companies and enterprises	55	0	0	(D)
Health care services	621-23	4	32	10
Other nonmanufacturing [2]	56, 61, 624, 71, 72, 81	42	29	(D)
Small nonmanufacturing companies [3]	Fewer than 15 employees	(D)	522	227

See explanatory information and SOURCE at end of table.

Table A-13. **Federal funds for industrial R&D performance in the U.S., by industry and by size of company: 1997-99**

Industry and size of company		1997 [1]	1998 [1]	1999
		[In millions of dollars]		
Distribution by size of company: [Number of employees]				
Total		23,928	24,164	22,535
5 to 24		468	638	611
25 to 49		283	466	368
50 to 99		431	581	603
100 to 249		572	1,186	674
250 to 499		456	565	485
500 to 999		376	363	591
1,000 to 4,999		540	620	896
5,000 to 9,999		612	536	2,194
10,000 to 24,999		913	(S) 955	397
25,000 or more		19,277	18,253	15,717

[1] The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the "NOTES" below.

[2] Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "Other manufacturing"; nonmanufacturing companies that could not be classified with a NAICS code are included in "Other nonmanufacturing."

[3] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY:

(D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

The R&D in this table is the industrial R&D performed outside company facilities funded by the Federal Government. Excluded from this table are R&D not performed within the company (e.g., R&D contracted out to other organizations) and R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

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Table A-14. **Federal funds for industrial R&D performance in the U.S., by industry**

Industry	NAICS codes	Total
Distribution by industry		
All industries	21-23, 31-33, 42, 44-81	22,535
Manufacturing	31-33	17,055
Food	311	0
Beverage and tobacco products	312	0
Textiles, apparel, and leather	313-16	0
Wood products	321	0
Paper, printing and support activities	322, 323	(D)
Petroleum and coal products	324	(D)
Chemicals	325	194
Basic chemicals	3251	98
Resin, synthetic rubber, fibers, and filament	3252	(D)
Pharmaceuticals and medicines	3254	(D)
Other chemicals	325 (minus 3251-52, 3254)	(D)
Plastics and rubber products	326	0
Nonmetallic mineral products	327	(D)
Primary metals	331	12
Fabricated metal products	332	46
Machinery	333	(S) 399
Computer and electronic products	334	5,993
Computers and peripheral equipment	3341	(D)
Communications equipment	3342	206
Semiconductor and other electronic components	3344	77
Navigational, measuring, electromedical, and control instruments	3345	5,705
Other computer and electronic products	334 (minus 3341-42, 3344-45)	(D)
Electrical equipment, appliances, and components	335	(D)

See explanatory information and SOURCE at end of table.

ry, by size of company: 1999

Page 1 of 3

Size of company [number of employees]									
5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In millions of dollars]									
611	368	603	674	485	591	896	2,194	397	15,717
104	(D)	(S) 12	77	64	258	358	(D)	(D)	14,508
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	(D)	(D)	0	0	0	0	0	0
(D)	0	0	0	0	0	0	0	0	(D)
0	0	0	0	0	0	0	0	(D)	0
(D)	0	0	(D)	(D)	0	112	11	(D)	(D)
(D)	0	0	(D)	(D)	0	(D)	(D)	(D)	0
0	0	0	0	0	0	(D)	(D)	0	(D)
0	0	0	0	(D)	0	(D)	(D)	0	0
0	0	0	0	0	0	0	(D)	0	(D)
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	(D)	0
0	0	0	0	0	0	1	(D)	(D)	(D)
(D)	0	0	1	23	0	(D)	(D)	(D)	(D)
50	0	0	1	(D)	(D)	(D)	(D)	(D)	(D)
0	0	0	55	(D)	136	237	(D)	(D)	(D)
0	0	0	(D)	0	(D)	0	(D)	0	0
0	0	0	0	(D)	(D)	(D)	(D)	(D)	(D)
0	0	0	52	0	(D)	(D)	0	6	0
0	0	0	(D)	(D)	(D)	214	(D)	(D)	(D)
0	0	0	0	0	0	(D)	0	(D)	0
0	0	(D)	8	(D)	(D)	0	0	0	(D)

Table A-14. **Federal funds for industrial R&D performance in the U.S., by indus**

Industry	NAICS codes	Total
Distribution by industry:		
Transportation equipment	336	10,037
Motor vehicles, trailers, and parts	3361-63	(D)
Aerospace products and parts	3364	9,117
Other transportation equipment	336 (minus 3361-64)	(D)
Furniture and related products	337	0
Miscellaneous manufacturing	339	26
Medical equipment and supplies	3391	(D)
Other miscellaneous manufacturing	339 (minus 3391)	(D)
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--
Small manufacturing companies [1]	Fewer than 50 employees	69
Nonmanufacturing	21-23, 42, 44-81	5,479
Mining, extraction, and support activities	21	(D)
Utilities	22	17
Construction	23	2
Trade	42, 44, 45	95
Transportation and warehousing	48, 49	0
Information	51	497
Publishing	511	49
Newspaper, periodical, book, and database	5111	0
Software	5112	49
Broadcasting and telecommunications	513	(D)
Radio and television broadcasting	5131	(D)
Telecommunications	5133	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	13
Other information	51 (minus 511, 513)	(D)

See explanatory information and SOURCE at end of table

stry, by size of company: 1999

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Size of company [number of employees]									
5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In millions of dollars]									
(D)	0	(D)	(D)	0	94	2	672	(D)	9,180
(D)	0	0	0	0	(D)	2	(D)	0	(D)
0	0	(D)	(D)	0	(D)	0	(D)	(D)	(D)
0	0	0	0	0	68	0	(D)	(D)	(D)
0	0	0	0	0	0	0	0	0	0
0	0	(D)	4	0	21	0	0	0	(D)
0	0	(D)	4	0	(D)	0	0	0	(D)
0	0	0	0	0	(D)	0	0	0	0
--	--	--	--	--	--	--	--	--	--
(D)	(D)	0	(D)	0	(D)	0	0	0	0
507	(D)	590	597	421	333	538	(D)	(D)	1,209
0	0	0	0	0	0	0	0	(D)	0
0	0	0	0	0	0	(D)	4	0	(D)
0	0	0	0	0	0	(D)	(D)	0	(D)
0	0	26	1	(D)	(D)	(D)	0	(D)	(D)
0	0	0	0	0	0	0	0	0	0
2	12	14	12	(D)	(D)	(D)	0	0	(D)
2	12	2	12	(D)	(D)	(D)	0	0	0
0	0	0	0	0	0	0	0	0	0
2	12	2	12	(D)	(D)	(D)	0	0	0
0	0	13	0	0	0	(D)	0	0	(D)
0	0	0	0	0	0	(D)	0	0	(D)
0	0	0	0	0	0	0	0	0	(D)
0	0	13	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	(D)

Table A-14. **Federal funds for industrial R&D performance in the U.S., by indus**

Industry	NAICS codes	Total
Distribution by industry:		
Finance, insurance, and real estate	52, 53	(D)
Professional, scientific, and technical services	54	4,615
Architectural, engineering, and related services	5413	1,177
Computer systems design and related services	5415	(D)
Scientific R&D services	5417	3,057
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	(D)
Management of companies and enterprises	55	(D)
Health care services	621-23	10
Other nonmanufacturing	56, 61, 624, 71, 72, 81	(D)
Small nonmanufacturing companies [1]	Fewer than 15 employees	227

[1] The frame from which the statistical sample was selected was divided into two partitions based or included in the large company partition. In the nonmanufacturing sector, companies with employr employment below these values, but with at least 5 employees, were included in the small compa attributed to the random year-to-year selection of small companies by industry and the high sampl possible only from the large company partition; detailed industry statistics from the small company included in manufacturing, nonmanufacturing, and all industries totals. Note that because compa available from the sampling frame and the number of employees may have been revised during s threshold for manufacturing companies and the 15 employee threshold for nonmanufacturing com

KEY (D) = Data have been withheld to avoid disclosing operations of individual companies
(S) = Indicates imputation of more than 50 percent
-- = Indicates data not collected

NOTE: Starting with the 1999 survey, estimates are based on the North American Industry Clas (SIC) system.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Indust

try, by size of company: 1999

Size of company [number of employees]									
5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In millions of dollars]									
0	0	0	0	0	0	(D)	0	0	0
278	338	550	584	401	287	512	(D)	(D)	(D)
14	123	194	152	185	(D)	(D)	(D)	(D)	0
89	(D)	91	21	(D)	(D)	15	0	0	(D)
176	166	265	411	166	143	198	(D)	0	(D)
0	(D)	0	0	(D)	0	(D)	(D)	0	0
0	(D)	0	0	0	0	0	0	0	0
0	2	0	0	(D)	0	0	0	(D)	0
0	0	0	0	(D)	(D)	0	0	0	0
227	0	0	0	0	0	0	0	0	0

total company employment. In the manufacturing sector, companies with employment of 50 or more were
nent of 15 or more were included in the large company partition. Companies in the respective sectors with
ny partition. The purpose of partitioning the sample this way was to reduce the variability in industry
ing weights that sometimes were assigned to them. Because of this, detailed industry statistics were
partition were not possible. Statistics from the small company partition are shown separately and are
nies were assigned to the "small company" partition of the sample based on preliminary information
tatistical processing, some companies' statistics are reported in size categories above the 50 employee
panies. For more detailed information, please see "frame creation" and "sample selection" in Section B.

sification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification

ial Research and Development: 1999

Table A-15. **Federal funds for industrial R&D performance in the U.S. and number of c by industry and by size of company, by size of federally funded R&D program: 1999**

Industry and size of company	NAICS codes	Total number of companies	Total amount	L t $2(
				Number of companie
Distribution by industry:				
All industries	21-23, 31-33, 42, 44-81	2,861	22,535	75
Manufacturing	31-33	789	17,055	15
Food	311	0	0	
Beverage and tobacco products	312	0	0	
Textiles, apparel, and leather	313-16	0	0	
Wood products	321	4	0	
Paper, printing and support activities	322, 323	2	(D)	
Petroleum and coal products	324	1	(D)	
Chemicals	325	19	194	
Basic chemicals	3251	11	98	
Resin, synthetic rubber, fibers, and filament	3252	2	(D)	
Pharmaceuticals and medicines	3254	4	(D)	
Other chemicals	325 (minus 3251-52, 3254)	2	(D)	
Plastics and rubber products	326	0	0	
Nonmetallic mineral products	327	1	(D)	
Primary metals	331	6	12	
Fabricated metal products	332	22	46	
Machinery	333	81	(S) 399	4
Computer and electronic products	334	75	5,993	
Computers and peripheral equipment	3341	3	(D)	
Communications equipment	3342	7	206	
Semiconductor and other electronic components	3344	35	77	
Navigational, measuring, electromedical, and control instruments	3345	29	5,705	
Other computer and electronic products	334 (minus 3341-42, 3344-45)	1	(D)	

See explanatory information and SOURCE at end of table.

ompanies that performed federally funded R&D in the U.S.,

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Size of R&D Program									
ess han 0,000		$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
s	Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
2	17	1,145	358	660	1,360	244	2,219	60	18,581
0	6	408	65	90	165	96	759	45	16,061
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	1	(D)	1	(D)
0	0	0	0	0	0	0	0	1	(D)
0	0	3	(D)	3	(D)	8	118	5	73
0	0	2	(D)	3	(D)	4	(D)	2	(D)
0	0	0	0	0	0	0	0	2	(D)
0	0	1	(D)	0	0	3	(D)	0	0
0	0	0	0	0	0	1	(D)	1	(D)
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	1	(D)
0	0	0	0	3	4	2	(D)	1	(D)
0	0	0	0	17	28	5	(D)	0	(D)
6	1	0	0	29	52	2	(D)	4	(D)
0	0	5	1	25	56	32	414	13	5,522
0	0	0	0	0	0	2	(D)	1	(D)
0	0	0	0	0	0	6	(D)	1	(D)
0	0	5	1	23	(D)	5	16	3	(D)
0	0	0	0	2	(D)	18	(D)	8	5,404
0	0	0	0	0	0	1	(D)	0	0

Table A-15. Federal funds for industrial R&D performance in the U.S. and number of con by industry and by size of company, by size of federally funded R&D program: 1999

				Les tha $200,
Industry and size of company	NAICS codes	Total number of companies	Total amount	Number of companies
Distribution by industry:				
Electrical equipment, appliances, and components	335	7	(D)	0
Transportation equipment	336	55	10,037	0
Motor vehicles, trailers, and parts	3361-63	31	(D)	0
Aerospace products and parts	3364	16	9,117	0
Other transportation equipment	336 (minus 3361-64)	8	(D)	0
Furniture and related products	337	0	0	0
Miscellaneous manufacturing	339	14	26	0
Medical equipment and supplies	3391	13	(D)	0
Other miscellaneous manufacturing	339 (minus 3391)	1	(D)	0
Other manufacturing	31-33 (minus 311-16, 331-37, 339)	--	--	--
Small manufacturing companies [1]	Fewer than 50 employees	501	69	100
Nonmanufacturing	21-23, 42, 44-81	2,072	5,479	602
Mining, extraction, and support activities	21	1	(D)	0
Utilities	22	7	17	1
Construction	23	3	2	0
Trade	42, 44, 45	109	95	0
Transportation and warehousing	48, 49	0	0	0
Information	51	81	497	0
Publishing	511	67	49	0
Newspaper, periodical, book, and database	5111	0	0	0
Software	5112	67	49	0

See explanatory information and SOURCE at end of table.

panies that performed federally funded R&D in the U.S.,

Size of R&D Program								
s 00	$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
0	0	0	4	12	1	(D)	2	(D)
0	0	0	1	(D)	38	(D)	16	9,853
0	0	0	0	0	28	18	3	(D)
0	0	0	1	(D)	5	(D)	10	9,055
0	0	0	0	0	5	103	3	(D)
0	0	0	0	0	0	0	0	0
0	0	0	7	(D)	6	22	1	(D)
0	0	0	6	(D)	6	22	1	(D)
0	0	0	1	(D)	0	0	0	0
--	--	--	--	--	--	--	--	--
5	400	(D)	1	(D)	0	0	0	0
11	738	293	570	1,196	148	1,460	15	2,520
0	0	0	0	0	1	(D)	0	0
0	0	0	5	(D)	1	(D)	0	0
0	0	0	1	(D)	1	(D)	1	(D)
0	50	(D)	53	2	3	(D)	3	20
0	0	0	0	0	0	0	0	0
0	31	2	41	(D)	5	(D)	4	(D)
0	31	2	32	(D)	4	(D)	0	0
0	0	0	0	0	0	0	0	0
0	31	2	32	(D)	4	(D)	0	0

Table A-15. **Federal funds for industrial R&D performance in the U.S. and number of cor by industry and by size of company, by size of federally funded R&D program: 1999**

Industry and size of company	NAICS codes	Total number of companies	Total amount	Les tha $200
				Number of companies
Distribution by industry:				
Broadcasting and telecommunications	513	13	(D)	0
Radio and television broadcasting	5131	2	(D)	0
Telecommunications	5133	2	(D)	0
Other broadcasting and telecommunications	513 (minus 5131, 5133)	9	13	0
Other information	51 (minus 511, 513)	1	(D)	0
Finance, insurance, and real estate	52, 53	1	(D)	0
Professional, scientific, and technical services	54	813	4,615	51
Architectural, engineering, and related services	5413	213	1,177	3
Computer systems design and related services	5415	196	(D)	46
Scientific R&D services	5417	402	3,057	1
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	2	(D)	0
Management of companies and enterprises	55	1	(D)	0
Health care services	621-23	53	10	50
Other nonmanufacturing	56, 61, 624, 71, 72, 81	3	(D)	0
Small nonmanufacturing companies [1]	Fewer than 15 employees	1,000	227	500

See explanatory information and SOURCE at end of table.

npanies that performed federally funded R&D in the U.S.,

Size of R&D Program								
ss n 000	$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
0	0	0	9	13	1	(D)	3	(D)
0	0	0	0	0	1	(D)	1	(D)
0	0	0	0	0	0	0	2	(D)
0	0	0	9	13	0	0	0	0
0	0	0	0	0	0	0	1	(D)
0	0	0	1	(D)	0	0	0	0
4	155	42	465	1,127	136	1,378	6	2,063
0	71	18	118	(D)	20	407	2	(D)
4	23	7	119	224	8	(D)	0	0
0	62	18	228	555	107	(D)	4	(D)
0	0	0	1	(D)	1	(D)	0	0
0	0	0	1	(D)	0	0	0	0
2	0	0	2	(D)	0	0	1	(D)
0	1	(D)	1	(D)	1	(D)	0	0
4	500	222	0	0	0	0	0	0

Table A-15. **Federal funds for industrial R&D performance in the U.S. and number of co by industry and by size of company, by size of federally funded R&D program: 1999**

Industry and size of company		Total number of companies	Total amount	Le th $20
				Number of companies
Distribution by size of company: [Number of employees]				
Total		2,861	22,535	752
5 of 24		1,626	611	641
25 to 49		485	368	51
50 to 99		220	603	1
100 to 249		255	674	54
250 to 499		66	485	3
500 to 999		43	591	0
1,000 to 4,999		81	896	1
5,000 to 9,999		28	2,194	0
10,000 to 24,999		21	397	0
25,000 or more		37	15,717	0

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company company partition In the nonmanufacturing sector, companies with employment of 15 or more were included in t least 5 employees, were included in the small company partition The purpose of partitioning the sample this way companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, d company partition were not possible Statistics from the small company partition are shown separately and all ind

KEY (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected

NOTE Starting with the 1999 survey, estimates are based on the North American Industry Classification Syste

The R&D in this table is the industrial R&D performed within company facilities funded from all sources outside organizations such as other companies, research institutions, universities and colleges, nonpro within the company (e g., R&D contracted out to other organizations) and company-funded R&D not pe

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research a

npanies that performed federally funded R&D in the U.S.,

Size of R&D Program								
ss in ,000	$200,000 to $999,999		$1 million to $9.9 million		$10 million to $99.9 million		$100 million or more	
Amount [In millions of dollars]	Number of companies	[In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]	Number of companies	Amount [In millions of dollars]
17	1,145	358	660	1,360	244	2,219	60	18,581
13	827	300	158	298	0	0	0	0
2	224	18	196	329	13	18	0	0
(D)	71	33	117	423	31	(D)	0	0
(D)	13	4	125	212	63	(D)	0	0
0	5	1	32	66	26	418	0	0
0	6	1	8	12	28	(D)	1	(D)
0	0	0	18	14	55	(D)	6	(D)
0	0	0	6	6	15	99	7	2,088
0	0	0	0	0	7	40	14	357
(D)	0	0	0	0	5	(D)	32	15,699

employment. In the manufacturing sector, companies with employment of 50 or more were included in the large
he large company partition. Companies in the respective sectors with employment below these values, but with at
was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small
etailed industry statistics were possible only from the large company partition; detailed industry statistics from the small
ustries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

n (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

except the Federal Government. The funds predominantly are the company's own, but also include funds from
t organizations, and State governments. Excluded from this table are company-funded R&D not performed
formed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

d Development: 1999

Table A-16. Federal funds for industrial R&D performance in the U.S., by selected Federal agency and selected industry: 1997-99

Industry	NAICS codes	1997 [1]		1998 [1]		1999	
		[In millions of dollars]					
All agencies			23,928		24,164		22,535
Chemicals	325		107		236		194
Machinery	333		141		(D)	(S)	399
Computer and electronic products	334		4,291		6,336		5,993
Electrical equipment, appliances, and components	335		160		141		(D)
Motor vehicles, trailers, and parts	3361-63		(D)		(D)		(D)
Other transportation equipment	336 (minus 3361-64)		(D)		(D)		716
Aerospace products and parts	3364		10,904		9,838		9,117
Other industries [2]	--		6,527		6,417		5,686
DoD							
Total		(S)	12,603		13,709	(S)	11,650
Chemicals	325	(S)	35	(S)	35	(S)	81
Machinery	333		13		(D)		(D)
Computer and electronic products	334		4,087		6,185	(S)	5,481
Electrical equipment, appliances, and components	335		(D)		(D)		(D)
Motor vehicles, trailers, and parts	3361-63		(D)		(D)		(D)
Other transportation equipment	336 (minus 3361-64)		(D)		(D)		(D)
Aerospace products and parts	3364	(S)	5,196		5,055		4,076
Other industries [2]	--		2,060		2,145	(S)	1,322
NASA							
Total		(S)	2,022	(S)	1,522	(S)	1,469
Chemicals	325	(S)	7	(S)	7		(D)
Machinery	333		(D)		(D)		(D)
Computer and electronic products	334	(S)	86	(S)	93	(S)	267
Electrical equipment, appliances, and components	335		(D)		(D)		(D)
Motor vehicles, trailers, and parts	3361-63		(D)		(D)		(D)
Other transportation equipment	336 (minus 3361-64)		(D)		0		(D)
Aerospace products and parts	3364	(S)	1,102		977		566
Other industries [2]	--		738		323	(S)	457
DOE							
Total		(S)	2,505	(S)	1,998		2,209
Chemicals	325	(S)	10	(S)	10		(D)
Machinery	333		30		(D)		(D)
Computer and electronic products	334		(D)	(S)	22		(D)
Electrical equipment, appliances, and components	335		(D)		(D)		(D)
Motor vehicles, trailers, and parts	3361-63		1		(D)		(D)
Other transportation equipment	336 (minus 3361-64)		(D)		0		0
Aerospace products and parts	3364	(S)	1,336	(S)	1,173		1,778
Other industries [2]	--		968		672	(S)	255

[1] The totals for "all agencies" prior to 1999 are identical to the corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

[2] Estimates for all manufacturing companies with at least 5 but with fewer than 50 employees and nonmanufacturing companies with at least 5 but with fewer than 15 employees are combined with those for companies in 'Other industries' without regard to industry classification.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

Data for DoD, NASA, and DOE do not sum to the totals because the data reported by other Federal agencies are included in the totals but not shown separately. In addition, Federal R&D data collected on the Form RD-1A are not allocated by agency type.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-17. **Industry-administered federally funded R&D centers (FFRDCs)--R&D funds by character of work, number of full-time equivalent (FTE) R&D scientists and engineers, and total employment: 1997-99**

Item	1997	1998	1999
	[In millions of dollars]		
Total R&D funds	(D)	(D)	(D)
Basic research	(D)	(D)	(D)
Applied research	213	230	274
Development	(D)	(D)	(D)
	[Employment]		
Number of FTE R&D scientists and engineers [1]	(D)	(D)	(D)
Total employment [2]	(D)	(D)	(D)

[1] These data were recorded in January of the year following the year indicated.

[2] These data were recorded in March of the year indicated.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.

NOTES: Industry-administered Federally-funded research and development centers (FFRDCs) conduct R&D almost exclusively for use by the Federal Government. Data for these FFRDCs administered by industry are included in Federal R&D support shown in other tables under the industry classifications of the administering firms. See section B for a listing of industry-administered FFRDCs and their locations.

The number of industrially administered FFRDCs as well as the number of companies that administer FFRDCs have decreased to the point where there is the danger of disclosing company-specific information. To avoid this danger, most cells in this table have been suppressed and production of this table will be discontinued in the future.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-18. **Domestic net sales of companies that performed industrial R&D in th**

Industry	NAICS codes	Total	5 to 24
Distribution by industry			
All industries	21-23, 31-33, 42, 44-81	5,856,396	38,554
Manufacturing	31-33	3,126,793	13,66
Food	311	302,077	(
Beverage and tobacco products	312	52,984	(
Textiles, apparel, and leather	313-16	47,352	(D
Wood products	321	13,772	(
Paper, printing and support activities	322, 323	172,710	(
Petroleum and coal products	324	157,630	(
Chemicals	325	392,618	(
Basic chemicals	3251	129,774	(
Resin, synthetic rubber, fibers, and filament	3252	52,526	(
Pharmaceuticals and medicines	3254	116,900	(
Other chemicals	325 (minus 3251-52, 3254)	93,419	(
Plastics and rubber products	326	91,586	(
Nonmetallic mineral products	327	40,785	(D
Primary metals	331	110,440	1,06
Fabricated metal products	332	113,290	35
Machinery	333	172,635	62
Computer and electronic products	334	350,254	1,30
Computers and peripheral equipment	3341	64,016	(
Communications equipment	3342	50,067	(
Semiconductor and other electronic components	3344	128,333	1,30
Navigational, measuring, electromedical, and control instruments	3345	94,626	(
Other computer and electronic products	334 (minus 3341-42, 3344-45)	13,212	(
Electrical equipment, appliances, and components	335	163,892	62

See explanatory information and SOURCE at end of table.

e U.S., by industry, by size of company: 1999

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Size of company [number of employees]								
25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In millions of dollars]								
41,243	50,899	94,852	126,124	160,105	764,918	631,873	891,633	3,056,197
19,731	28,712	68,689	61,347	118,203	516,835	414,239	609,538	1,275,833
0	1,332	3,682	2,608	7,914	55,198	35,169	73,283	122,892
0	0	0	(D)	0	3,509	(D)	0	(D)
274	1,196	1,880	1,811	3,659	15,150	3,822	16,053	(D)
0	945	788	99	292	7,192	(D)	(D)	0
0	0	3,710	668	4,805	18,343	9,497	40,001	95,685
0	899	0	727	(D)	(D)	(D)	98,680	(D)
1,743	2,597	13,068	6,734	9,077	69,514	54,531	102,292	133,063
50	(D)	1,638	2,319	3,590	27,447	14,645	26,280	(D)
0	0	0	(D)	0	9,116	7,471	(D)	(D)
0	(D)	3,906	(D)	1,374	11,976	10,151	47,823	(S) 41,417
1,693	1,941	7,524	4,039	4,113	20,975	22,263	(D)	(D)
0	1,077	4,666	10,712	7,116	21,955	21,368	6,413	18,279
0	1,413	567	3,040	(D)	13,889	12,253	9,334	0
0	2,513	(D)	1,342	9,174	19,874	16,296	20,480	(D)
688	1,897	9,729	7,446	10,303	16,289	25,186	17,419	23,982
558	5,173	8,145	6,542	18,063	32,825	39,492	36,077	25,134
512	2,112	9,079	12,071	22,529	72,632	57,703	58,512	113,799
4	573	1,349	2,434	1,050	6,972	16,723	(D)	(D)
0	0	1,980	2,406	3,651	12,636	8,718	(D)	(D)
0	1,075	3,641	4,563	5,775	34,297	24,643	(D)	(D)
0	464	1,533	2,244	5,824	13,252	7,618	14,739	48,951
508	0	575	423	6,230	5,475	0	0	0
0	775	2,157	3,380	7,422	(D)	11,685	33,036	(D)

Table A-18. **Domestic net sales of companies that performed industrial R&D in th**

Industry	NAICS codes	Total	5 to 24
Distribution by industry			
Transportation equipment	336	813,051	0
Motor vehicles, trailers, and parts	3361-63	610,575	0
Aerospace products and parts	3364	163,464	0
Other transportation equipment	336 (minus 3361-64)	39,013	0
Furniture and related products	337	34,082	0
Miscellaneous manufacturing	339	67,349	536
Medical equipment and supplies	3391	42,152	153
Other miscellaneous manufacturing	339 (minus 3391)	25,197	383
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--
Small manufacturing companies [1]	Fewer than 50 employees	30,286	9,163
Nonmanufacturing	21-23, 42, 44-81	2,729,604	24,887
Mining, extraction, and support activities	21	124,380	0
Utilities	22	194,395	0
Construction	23	22,456	10
Trade	42, 44, 45	355,802	4,035
Transportation and warehousing	48, 49	87,559	50
Information	51	433,439	2,220
Publishing	511	84,262	830
Newspaper, periodical, book, and database	5111	19,028	0
Software	5112	65,234	830
Broadcasting and telecommunications	513	323,069	0
Radio and television broadcasting	5131	(D)	0
Telecommunications	5133	313,679	0
Other broadcasting and telecommunications	513 (minus 5131, 5133)	(D)	0

See explanatory information and SOURCE at end of table.

e U.S., by industry, by size of company: 1999

Size of company [number of employees]								
25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In millions of dollars]								
215	530	3,256	589	11,321	119,141	74,769	79,053	524,176
215	0	1,645	0	8,107	111,015	58,380	64,239	366,974
0	(D)	(D)	0	(D)	2,107	12,281	(D)	(D)
0	(D)	(D)	589	(D)	6,020	4,108	(D)	(D)
0	351	1,623	579	1,126	9,243	7,711	13,448	0
0	1,871	4,840	2,939	4,034	21,589	7,442	(D)	(D)
0	608	1,817	1,184	1,307	10,519	7,442	(D)	(D)
0	1,263	3,022	1,755	2,727	11,071	0	(D)	(D)
--	--	--	--	--	--	--	--	--
15,742	4,030	765	(D)	(D)	0	0	0	0
21,511	22,187	26,164	64,777	41,901	248,083	217,634	282,095	1,780,364
(D)	465	0	6,647	6,744	47,099	(D)	36,543	0
0	0	0	0	(D)	25,662	78,835	77,695	(D)
2,069	3,338	849	(D)	547	(D)	2,604	(D)	(D)
7,003	4,925	9,767	8,446	13,974	62,659	38,968	38,278	167,746
150	0	(D)	0	(D)	(D)	12,473	22,058	49,260
3,592	2,563	5,876	5,542	8,802	26,714	11,667	31,756	334,709
3,542	2,073	4,766	3,821	7,440	(D)	8,968	23,451	(D)
0	796	1,768	0	(D)	(D)	0	(D)	(D)
3,542	1,277	2,998	3,821	(D)	18,702	8,968	(D)	0
49	20	178	0	(D)	(D)	0	(D)	315,256
49	0	(D)	0	0	(D)	0	0	(D)
0	0	(D)	0	(D)	(D)	0	(D)	307,679
0	20	174	0	(D)	0	0	0	(D)

Table A-18. **Domestic net sales of companies that performed industrial R&D in the**

Industry	NAICS codes	Total	5 to 24
Distribution by industry			
Other information	51 (minus 511, 513)	26,108	1,390
Finance, insurance, and real estate	52, 53	336,793	624
Professional, scientific, and technical services	54	124,483	2,673
Architectural, engineering, and related services	5413	35,304	905
Computer systems design and related services	5415	36,394	1,196
Scientific R&D services	5417	23,114	516
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	29,672	56
Management of companies and enterprises	55	1,268	(S) 0
Health care services	621-23	9,801	277
Other nonmanufacturing	56, 61, 624, 71, 72, 81	1,004,772	115
Small nonmanufacturing companies	Fewer than 15 employees	34,455	14,883

The frame from which the statistical sample was selected was divided into two partitions based on total com
in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more
below these values, but with at least 5 employees, were included in the small company partition. The purpo
to the random year-to-year selection of small companies by industry and the high sampling weights that som
only from the large company partition, detailed industry statistics from the small company partition were not
in manufacturing, nonmanufacturing, and all industries totals. Note that because companies were assigned
the sampling frame and the number of employees may have been revised during statistical processing, som
manufacturing companies and the 15 employee threshold for nonmanufacturing companies. For more detai

KEY (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
– = Indicates data not collected.

NOTE Starting with the 1999 survey, estimates are based on the North American Industry Classification S

SOURCE National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Resear

U.S., by industry, by size of company: 1999

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Size of company [number of employees]								
25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In millions of dollars]								
1	471	932	1,721	(D)	3,985	2,699	(D)	(D)
(D)	39	(D)	9,468	1,300	53,532	24,859	23,626	223,079
7,347	8,375	8,846	7,631	7,265	24,024	15,053	21,315	21,956
2,867	1,759	1,497	1,609	1,159	3,626	5,222	16,659	0
2,748	2,934	3,544	4,165	(D)	6,479	5,433	0	(D)
1,529	2,683	2,615	(D)	2,039	4,982	(D)	(D)	(D)
203	999	1,190	(D)	(D)	8,937	(D)	(D)	(D)
30	(D)	(D)	(D)	0	772	0	0	0
557	0	0	176	0	0	(D)	(D)	0
285	1,929	654	1,592	281	6,031	6,557	22,033	965,293
0	(D)	(D)	18,980	0	0	0	0	0

pany employment. In the manufacturing sector, companies with employment of 50 or more were included
were included in the large company partition. Companies in the respective sectors with employment
se of partitioning the sample this way was to reduce the variability in industry attributed
etimes were assigned to them. Because of this, detailed industry statistics were possible
ossible. Statistics from the small company partition are shown separately and are included
to the "small company" partition of the sample based on preliminary information available from
e companies' statistics are reported in size categories above the 50 employee threshold for
ed information, please see "frame creation" and "sample selection" in Section B.

ystem (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system

ch and Development: 1999

Table A-19. **Concentration of total, Federal, and company and other industrial R&D funds and net sales of companies that performed industrial R&D in the U.S., ranked by size of R&D program: 1989-99**

Companies ranked by size of R&D program	1989 [1]	1990 [1]	1991 [1,2]	1992 [2]	1993 [2]	1994 [2]	1995 [2]	1996 [2]	1997 [2]	1998 [2]	1999 [2]
	Percent of total (company, Federal, and other) R&D funds										
First 4 (1-4)	19	18	16	15	17	15	16	15	14	12	11
Next 4 (5-8)	13	13	8	8	7	8	8	8	8	8	8
Next 12 (9-20)	16	15	12	13	13	14	13	13	13	13	13
Next 20 (21-40)	12	12	11	11	12	13	12	12	11	11	11
Next 60 (41-100)	15	16	15	15	16	15	14	14	14	13	13
Next 100 (101-200)	8	9	12	12	8	9	8	9	9	9	9
Next 200 (201-400)	6	7	6	6	7	7	7		8	8	7
	Percent of Federal R&D funds										
First 4 (1-4)	36	38	14	11	23	26	35	37	40	46	47
Next 4 (5-8)	15	16	21	18	17	19	19	20	23	17	14
Next 12 (9-20)	30	26	21	27	32	32	27	23	18	14	15
Next 20 (21-40)	11	12	15	13	16	13	8	7	7	7	8
Next 60 (41-100)	6	6	13	11	5	7	5	5	5	7	7
Next 100 (101-200)	1	1	3	4	5	2	3	4	3	5	4
Next 200 (201-400)	0	0	2	2	2	1	3	4	4	4	5
	Percent of company and other (except Federal) R&D funds										
First 4 (1-4)	22	21	17	17	17	16	16	15	13	12	11
Next 4 (5-8)	7	7	7	8	7	7	7	7	7	7	8
Next 12 (9-20)	13	12	10	12	12	12	11	11	11	12	12
Next 20 (21-40)	12	13	10	11	11	11	11	10	11	10	10
Next 60 (41-100)	16	17	16	17	14	14	14	14	13	13	13
Next 100 (101-200)	10	10	15	14	9	9	9	10	10	10	9
Next 200 (201-400)	8	8	7	7	8	8	8	8	9	8	8
	Percent of net sales ranked by size of total R&D funds										
First 4 (1-4)	6	8	7	8	8	8	8	6	6	5	(S) 5
Next 4 (5-8)	5	4	3	3	3	2	2	3	2	3	2
Next 12 (9-20)	5	5	4	4	4	5	6	6	5	5	6
Next 20 (21-40)	5	5	4	4	4	5	4	4	5	5	4
Next 60 (41-100)	12	12	12	12	11	10	9	8	7	8	7
Next 100 (101-200)	8	9	9	9	8	8	8	11	8	8	7
Next 200 (201-400)	11	12	11	11	10	10	10	11	13	11	12

[1] As a result of a new sample design, statistics for 1989-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries.

[2] As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years. See the technical notes for more information.

KEY: (S) = Indicates imputation of more than 50 percent.

NOTE: Companies were ranked individually for each year; therefore, particular companies comprising the size groups may have changed from year to year.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-20. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company: 1997-99**

Page 1 of 3

Industry and size of company	NAICS codes	1997 [1]	1998 [1]	1999
		[Percent]		
Distribution by industry				
All industries	21-23, 31-33, 42, 44-81	3.4	3.6	3.1
Manufacturing	31-33	--	--	3.7
Food	311	0.4	0.4	0.4
Beverage and tobacco products	312	0.8	0.6	(D)
Textiles, apparel, and leather	313-16	0.8	0.9	0.7
Wood products	321	0.4	0.4	0.5
Paper, printing and support activities	322, 323	(D)	(D)	(D)
Petroleum and coal products	324	(D)	0.8	0.4
Chemicals	325	5.5	6.3	5.2
Basic chemicals	3251	2.6	4.9	2.1
Resin, synthetic rubber, fibers, and filament	3252	(D)	(D)	(D)
Pharmaceuticals and medicines	3254	(D)	(D)	(D)
Other chemicals	325 (minus 3251-52, 3254)	(D)	(D)	(D)
Plastics and rubber products	326	1.3	2.0	1.9
Nonmetallic mineral products	327	1.9	1.3	(D)
Primary metals	331	0.8	(D)	0.4
Fabricated metal products	332	1.7	1.5	1.5
Machinery	333	3.2	(D)	3.5
Computer and electronic products	334	9.1	9.6	10.3
Computers and peripheral equipment	3341	(D)	(D)	(D)
Communications equipment	3342	7.3	10.5	12.0
Semiconductor and other electronic components	3344	(D)	8.7	8.3
Navigational, measuring, electromedical, and control instruments	3345	12.4	13.6	15.2
Other computer and electronic products	334 (minus 3341-42, 3344-45)	4.0	(D)	(D)
Electrical equipment, appliances, and components	335	3.1	2.9	(D)
Transportation equipment	336	5.6	3.6	4.2
Motor vehicles, trailers, and parts	3361-63	(D)	(D)	(D)
Aerospace products and parts	3364	8.4	7.2	8.8
Other transportation equipment	336 (minus 3361-64)	(D)	(D)	(D)
Furniture and related products	337	0.9	0.9	0.7
Miscellaneous manufacturing	339	5.9	(D)	5.7
Medical equipment and supplies	3391	8.4	(D)	(D)
Other miscellaneous manufacturing	339 (minus 3391)	1.8	2.4	(D)
Other manufacturing [2]	31-33 (minus 311-16, 321-27, 331-37, 339)	(S) 0.7	(D)	--
Small manufacturing companies [3]	Fewer than 50 employees	4.2	4.4	10.0

See explanatory information and SOURCE at end of table.

Table A-20. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company: 1997-99**

Industry and size of company	NAICS codes	1997[1]	1998[1]	1999
			[Percent]	
Distribution by industry				
Nonmanufacturing	21-23, 42, 44-81	--	--	2.4
Mining, extraction, and support activities	21	(D)	(D)	(D)
Utilities	22	(D)	(D)	0.1
Construction	23	1.7	(D)	3.1
Trade	42, 44, 45	(D)	4.9	5.5
Transportation and warehousing	48, 49	(D)	0.3	0.5
Information	51	2.8	4.6	3.6
Publishing	511	11.6	13.3	13.4
Newspaper, periodical, book, and database	5111	1.2	1.3	2.0
Software	5112	19.3	20.0	16.8
Broadcasting and telecommunications	513	(D)	(D)	(D)
Radio and television broadcasting	5131	(D)	(D)	(D)
Telecommunications	5133	(D)	(D)	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	(D)	(D)	(D)
Other information	51 (minus 511, 513)	(D)	(D)	(D)
Finance, insurance, and real estate	52, 53	(D)	(D)	(D)
Professional, scientific, and technical services	54	14.4	15.5	15.3
Architectural, engineering, and related services	5413	6.4	9.5	10.1
Computer systems design and related services	5415	(D)	(D)	(D)
Scientific R&D services	5417	57.6	57.2	45.3
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	(D)	(D)	(D)
Management of companies and enterprises	55	(D)	28.5	(D)
Health care services	621-23	5.2	4.8	6.5
Other nonmanufacturing	56, 61, 624, 71, 72, 81	0.8	2.2	(D)
Small nonmanufacturing companies[3]	Fewer than 15 employees	(D)	19.8	15.1

See explanatory information and SOURCE at end of table.

Table A-20. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company: 1997-99**

Page 3 of 3

Industry and size of company		1997[1]	1998[1]	1999
		[Percent]		
Distribution by size of company: [Number of employees]				
Total		3.4	3.6	3.1
5 to 24		11.1	9.8	18.2
25 to 49		8.4	9.1	11.5
50 to 99		8.7	8.9	14.2
100 to 249		5.4	9.2	7.6
250 to 499		4.6	6.0	6.3
500 to 999		3.0	3.2	4.4
1,000 to 4,999		2.7	3.1	3.2
5,000 to 9,999		2.5	1.9	2.6
10,000 to 24,999		2.6	2.8	2.8
25,000 or more		3.9	4.1	2.5

[1] The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

[2] Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "Other manufacturing"; nonmanufacturing companies that could not be classified with a NAICS code are included in "Other nonmanufacturing."

[3] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
– = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-21. **Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company: 1997-99**

Page 1 of 3

Industry and size of company	NAICS codes	1997 [1]	1998 [1]	1999
Distribution by industry:				
All industries	21-23, 31-33, 42, 44-81	2.9	3.1	2.7
Manufacturing	31-33	--	--	3.2
Food	311	0.4	0.4	0.4
Beverage and tobacco products	312	0.8	0.6	(D)
Textiles, apparel, and leather	313-16	0.8	0.9	0.7
Wood products	321	0.4	0.4	0.5
Paper, printing and support activities	322, 323	1.4	1.0	1.4
Petroleum and coal products	324	0.5	0.8	(D)
Chemicals	325	5.5	6.2	5.1
Basic chemicals	3251	2.6	4.7	2.0
Resin, synthetic rubber, fibers, and filament	3252	3.5	3.9	4.2
Pharmaceuticals and medicines	3254	11.8	11.1	10.5
Other chemicals	325 (minus 3251-52, 3254)	2.9	4.0	3.2
Plastics and rubber products	326	1.3	2.0	1.9
Nonmetallic mineral products	327	1.9	(D)	1.5
Primary metals	331	0.6	0.5	0.4
Fabricated metal products	332	1.7	1.4	1.4
Machinery	333	3.1	3.1	3.3
Computer and electronic products	334	8.0	8.0	8.5
Computers and peripheral equipment	3341	7.7	7.2	6.4
Communications equipment	3342	6.9	9.9	11.6
Semiconductor and other electronic components	3344	9.1	8.6	8.3
Navigational, measuring, electromedical, and control instruments	3345	7.2	6.6	9.1
Other computer and electronic products	334 (minus 3341-42, 3344-45)	3.9	5.2	5.8
Electrical equipment, appliances, and components	335	2.9	2.7	2.3
Transportation equipment	336	3.5	2.4	2.9
Motor vehicles, trailers, and parts	3361-63	3.7	2.2	2.9
Aerospace products and parts	3364	3.3	2.9	3.2
Other transportation equipment	336 (minus 3361-64)	2.4	2.0	1.6
Furniture and related products	337	0.9	0.9	0.7
Miscellaneous manufacturing	339	5.9	6.7	5.7
Medical equipment and supplies	3391	8.3	9.4	7.7
Other miscellaneous manufacturing	339 (minus 3391)	1.8	2.4	2.3
Other manufacturing [2]	31-33 (minus 311-16, 321-27, 331-37, 339)	(S) 0.7	(D)	--
Small manufacturing companies [3]	Fewer than 50 employees	3.9	4.2	9.7

See explanatory information and SOURCE at end of table.

Table A-21. **Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company: 1997-99**

Page 2 of 3

Industry and size of company	NAICS codes	1997 [1]	1998 [1]	1999
Distribution by industry:				
Nonmanufacturing	21-23, 42, 44-81	--	--	2.2
Mining, extraction, and support activities	21	0.7	0.9	1.9
Utilities	22	0.1	0.1	0.1
Construction	23	1.7	2.6	3.1
Trade	42, 44, 45	4.7	4.8	5.5
Transportation and warehousing	48, 49	0.3	0.3	0.5
Information	51	2.7	4.4	3.4
Publishing	511	11.6	13.2	13.4
Newspaper, periodical, book, and database	5111	1.2	1.3	2.0
Software	5112	19.2	19.8	16.7
Broadcasting and telecommunications	513	0.7	0.9	0.4
Radio and television broadcasting	5131	(D)	(D)	(D)
Telecommunications	5133	(D)	0.9	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	(D)	(D)	(D)
Other information	51 (minus 511, 513)	2.0	8.0	8.6
Finance, insurance, and real estate	52, 53	0.5	0.4	0.5
Professional, scientific, and technical services	54	10.4	11.0	11.6
Architectural, engineering, and related services	5413	3.3	4.2	6.8
Computer systems design and related services	5415	10.4	9.5	11.0
Scientific R&D services	5417	38.5	40.7	32.1
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	(S) 3.7	2.9	1.9
Management of companies and enterprises	55	7.9	28.5	5.7
Health care services	621-23	5.2	4.5	6.4
Other nonmanufacturing	56, 61, 624, 71, 72, 81	0.8	2.2	0.1
Small nonmanufacturing companies [3]	Fewer than 15 employees	10.6	16.2	14.4

See explanatory information and SOURCE at end of table.

Table A-21. **Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company: 1997-99**

Page 3 of 3

Industry and size of company		1997[1]	1998[1]	1999
Distribution by size of company: [Number of employees]				
Total		2.9	3.1	2.7
5 to 24		9.5	8.5	16.6
25 to 49		7.6	7.8	10.6
50 to 99		7.8	8.1	13.0
100 to 249		5.0	8.0	6.9
250 to 499		4.3	5.5	5.9
500 to 999		2.8	3.0	4.0
1,000 to 4,999		2.6	3.0	3.1
5,000 to 9,999		2.4	1.8	2.2
10,000 to 24,999		2.5	2.7	2.8
25,000 or more		2.9	3.0	2.0

[1] The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

[2] Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "Other manufacturing"; nonmanufacturing companies that could not be classified with a NAICS code are included in "Other nonmanufacturing."

[3] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
– = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-22. **Total (Federal plus company and other) funds for industrial R&D pe that performed industrial R&D in the U.S., by industry and by size of company**

Industry and size of company	NAICS codes
Distribution by industry	
All industries	21-23, 31-33, 42, 44-81
Manufacturing	31-33
Food	311
Beverage and tobacco products	312
Textiles, apparel, and leather	313-16
Wood products	321
Paper, printing and support activities	322, 323
Petroleum and coal products	324
Chemicals	325
Basic chemicals	3251
Resin, synthetic rubber, fibers, and filament	3252
Pharmaceuticals and medicines	3254
Other chemicals	325 (minus 3251-52, 3254)
Plastics and rubber products	326
Nonmetallic mineral products	327
Primary metals	331
Fabricated metal products	332
Machinery	333
Computer and electronic products	334
Computers and peripheral equipment	3341
Communications equipment	3342
Semiconductor and other electronic components	3344
Navigational, measuring, electromedical, and control instruments	3345
Other computer and electronic products	334 (minus 3341-42, 3344-45

See explanatory information and SOURCE at end of table.

D performance in the U.S. as a percent of net sales of companies
any, ranked by size of R&D program: 1999

Page 1 of 4

	Total (Federal plus company and other) R&D funds			Total (Federal plus company and other) R&D funds as a percent of net sales		
	First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
	[In millions of dollars]			[Percent]		
4-81	19,298	14,354	23,915	6.8	12.6	7.0
1-33	19,298	13,034	18,620	6.8	10.2	6.3
311	387	198	256	0.9	0.5	0.3
312	371	8	0	0.7	0.7	0.0
3-16	(S) 119	57	59	1.7	1.2	0.7
321	41	8	6	0.6	0.6	0.2
323	1,922	199	229	3.6	1.0	0.5
324	486	88	8	0.5	0.2	0.1
325	5,413	3,957	5,639	10.1	7.2	5.5
3251	1,380	339	537	2.0	3.6	2.6
3252	1,920	198	103	4.9	2.3	2.3
3254	5,130	3,456	2,844	10.6	10.2	13.1
254)	1,831	324	376	6.5	3.0	2.4
326	596	176	274	3.5	2.1	1.8
327	413	92	59	3.4	1.3	0.8
331	193	73	108	0.4	0.8	0.5
332	718	188	221	2.7	2.1	1.2
333	(S) 1,934	770	935	6.8	5.0	5.2
334	15,202	4,087	5,003	18.1	18.6	11.6
3341	2,884	390	363	20.4	6.6	1.4
3342	4,181	321	464	17.3	6.3	4.7
3344	5,857	1,229	1,426	11.9	11.6	8.9
3345	9,415	1,558	1,700	19.2	16.3	10.9
4-45)	389	82	40	9.4	4.9	3.2

Table A-22. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company, ranked by size of R&D program: 1999**

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Industry and size of company	NAICS codes	Total (Federal plus company and other) R&D funds			Total (Federal plus company and other) R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
Electrical equipment, appliances, and components	335	2,758	259	372	2.9	2.0	2.0
Transportation equipment	336	17,131	6,745	5,424	5.3	5.4	6.9
Motor vehicles, trailers, and parts	3361-63	13,732	944	678	4.1	3.3	0.9
Aerospace products and parts	3364	10,143	3,470	781	9.1	10.2	5.2
Other transportation equipment	336 (minus 3361-64)	899	228	108	5.1	2.8	1.3
Furniture and related products	337	116	40	39	1.0	1.0	0.5
Miscellaneous manufacturing	339	2,264	327	375	9.6	4.1	4.4
Medical equipment and supplies	3391	2,201	262	274	10.2	5.6	5.2
Other miscellaneous manufacturing	339 (minus 3391)	278	73	75	3.0	3.9	2.9
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--
Small manufacturing companies [1]	Fewer than 50 employees	26	3	5	4.4	21.9	8.6
Nonmanufacturing	21-23, 42, 44-81	11,886	3,934	5,784	12.6	12.6	4.9
Mining, extraction, and support activities	21	296	68	59	1.6	0.2	0.8
Utilities	22	56	27	32	0.2	0.1	0.1
Construction	23	269	18	1	2.9	3.3	0.2
Trade	42, 44, 45	10,158	1,888	2,768	11.0	8.8	6.1
Transportation and warehousing	48, 49	322	10	6	0.8	0.1	0.1
Information	51	5,036	1,356	2,195	5.5	4.8	8.7
Publishing	511	4,350	978	1,609	20.1	27.8	9.7
Newspaper, periodical, book, and database	5111	(S) 193	18	2	1.6	0.4	4.8
Software	5112	4,350	978	1,598	20.1	27.8	10.2

See explanatory information and SOURCE at end of table.

Table A-22. **Total (Federal plus company and other) funds for industrial R&D p that performed industrial R&D in the U.S., by industry and by size of compan**

Industry and size of company	NAICS codes
Distribution by industry:	
Broadcasting and telecommunications	51
Radio and television broadcasting	513
Telecommunications	513
Other broadcasting and telecommunications	513 (minus 5131, 5133
Other information	51 (minus 511, 513
Finance, insurance, and real estate	52, 5
Professional, scientific, and technical services	5
Architectural, engineering, and related services	541
Computer systems design and related services	541
Scientific R&D services	541
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417
Management of companies and enterprises	5
Health care services	621-2
Other nonmanufacturing	56, 61, 624, 71, 72, 8
Small nonmanufacturing companies [1]	Fewer than 15 employee

See explanatory information and SOURCE at end of table.

performance in the U.S. as a percent of net sales of companies
ny, ranked by size of R&D program: 1999

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	Total (Federal plus company and other) R&D funds			Total (Federal plus company and other) R&D funds as a percent of net sales		
	First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
	[In millions of dollars]			[Percent]		
13	1,104	280	152	0.9	0.3	0.4
31	(D)	0	0	3.6	0.0	0.0
33	927	236	(S) 30	0.7	0.2	0.5
33)	16	0	0	9.2	0.0	0.0
13)	1,309	208	170	9.2	6.6	4.5
53	688	338	200	1.7	0.6	0.2
54	2,916	856	1,441	30.4	26.9	31.2
13	808	220	262	27.8	31.2	3.1
15	591	312	517	23.1	4.1	16.0
17	2,711	659	942	28.9	35.0	105.6
17)	177	60	53	10.0	0.9	0.8
55	23	1	(D)	4.5	0.2	0.0
23	(D)	3	0	8.0	0.2	2.8
81	245	(S) 87	101	2.4	6.8	0.7
es	53	14	4	48.2	26.3	39.5

Table A-22. Total (Federal plus company and other) funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company, ranked by size of R&D program: 1999

Industry and size of company		Total (Federal plus company and other) R&D funds			Total (Federal plus company and other) R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry: [Number of employees]							
Total		19,298	14,354	23,915	6.8	12.6	7.0
5 to 24		70	33	43	58.6	96.6	86.2
25 to 49		79	47	114	48.9	63.8	108.1
50 to 99		105	92	208	200.0	107.8	94.2
100 to 249		201	169	381	106.6	115.6	75.5
250 to 499		427	311	634	38.6	81.8	42.2
500 to 999		764	386	722	52.5	32.7	20.9
1,000 to 4,999		1,914	1,202	2,541	28.2	15.2	19.0
5,000 to 9,999		2,593	1,862	4,040	22.8	15.6	14.2
10,000 to 24,999		7,041	3,758	5,800	18.6	11.5	7.6
25,000 or more		19,298	14,354	22,145	6.8	12.6	6.1

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY:
(D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

Rankings were based on total (company, Federal, and other) R&D funds.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-23. **Company and other non-Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company, ranked by size of non-Federally funded R&D program: 1999**

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Industry and size of company	NAICS codes	Company and other non-Federal R&D funds			Company and other non-Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry:							
All industries	21-23, 31-33, 42, 44-81	17,286	12,621	18,735	5.7	15.2	5.6
Manufacturing	31-33	16,772	8,747	15,304	5.9	6.3	5.7
Food	311	387	198	256	0.9	0.5	0.3
Beverage and tobacco products	312	371	8	0	0.7	0.7	0.0
Textiles, apparel, and leather	313-16	(S) 119	57	59	1.7	1.2	0.7
Wood products	321	41	8	6	0.6	0.6	0.2
Paper, printing and support activities	322, 323	1,875	198	229	3.5	1.0	0.5
Petroleum and coal products	324	480	88	8	0.5	0.2	0.1
Chemicals	325	5,411	3,906	5,633	10.1	7.1	5.5
Basic chemicals	3251	1,373	322	497	2.0	3.5	2.4
Resin, synthetic rubber, fibers, and filament	3252	1,915	198	103	4.9	2.3	2.3
Pharmaceuticals and medicines	3254	5,130	3,456	2,843	10.6	10.2	13.1
Other chemicals	325 (minus 3251-52, 3254)	1,780	320	376	6.3	2.9	2.4
Plastics and rubber products	326	596	176	274	3.5	2.1	1.8
Nonmetallic mineral products	327	413	92	59	3.4	1.3	0.8
Primary metals	331	184	73	108	0.4	0.8	0.6
Fabricated metal products	332	718	186	205	2.7	2.1	1.1
Machinery	333	1,666	701	925	5.2	5.9	5.1
Computer and electronic products	334	11,596	2,927	4,440	15.3	16.5	7.8
Computers and peripheral equipment	3341	2,883	390	363	20.4	6.6	1.4
Communications equipment	3342	4,069	321	438	16.8	6.3	3.6
Semiconductor and other electronic components	3344	5,854	1,226	1,426	11.8	11.6	8.9
Navigational, measuring, electromedical, and control instruments	3345	4,553	1,189	1,502	10.1	9.6	8.8
Other computer and electronic products	334 (minus 3341-42, 3344-45)	389	82	40	9.4	4.9	3.2
Electrical equipment, appliances, and components	335	2,544	259	372	2.6	2.0	2.0

See explanatory information and SOURCE at end of table.

Table A-23. **Company and other non-Federal funds for industrial R&D performa performed industrial R&D in the U.S., by industry and by size of company, ran**

Industry and size of company	NAICS codes
Distribution by industry:	
Transportation equipment	336
Motor vehicles, trailers, and parts	3361-63
Aerospace products and parts	3364
Other transportation equipment	336 (minus 3361-64)
Furniture and related products	337
Miscellaneous manufacturing	339
Medical equipment and supplies	3391
Other miscellaneous manufacturing	339 (minus 3391)
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)
Small manufacturing companies [1]	Fewer than 50 employees
Nonmanufacturing	21-23, 42, 44-81
Mining, extraction, and support activities	21
Utilities	22
Construction	23
Trade	42, 44, 45
Transportation and warehousing	48, 49
Information	51

See explanatory information and SOURCE at end of table.

nce in the U.S. as a percent of net sales of companies that
xed by size of non-Federally funded R&D program: 1999

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Company and other non-Federal R&D funds			Company and other non-Federal R&D funds as a percent of net sales		
First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
[In millions of dollars]			[Percent]		
13,546	4,091	2,200	4.0	3.5	2.0
13,546	944	677	4.0	3.3	0.9
4,091	823	379	3.5	2.6	3.2
352	137	80	1.9	2.4	0.9
116	40	39	1.0	1.0	0.5
2,264	327	375	9.6	4.1	4.4
2,201	262	274	10.2	5.6	5.2
278	73	75	3.0	3.9	2.9
--	--	--	--	--	--
26	3	5	4.3	16.2	8.5
11,873	3,452	4,803	12.5	10.2	4.1
296	67	59	1.6	0.2	0.8
43	27	31	0.2	0.1	0.1
268	17	1	2.9	3.2	0.2
10,140	1,888	2,766	11.0	8.8	6.1
322	10	6	0.8	0.1	0.1
5,009	1,269	1,955	5.5	21.5	4.8

Table A-23. **Company and other non-Federal funds for industrial R&D performa**
performed industrial R&D in the U.S., by industry and by size of company, ran

Industry and size of company	NAICS codes
Distribution by industry:	
Publishing	511
Newspaper, periodical, book, and database	5111
Software	5112
Broadcasting and telecommunications	513
Radio and television broadcasting	5131
Telecommunications	5133
Other broadcasting and telecommunications	513 (minus 5131, 5133)
Other information	51 (minus 511, 513)
Finance, insurance, and real estate	52, 53
Professional, scientific, and technical services	54
Architectural, engineering, and related services	5413
Computer systems design and related services	5415
Scientific R&D services	5417
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)
Management of companies and enterprises	55
Health care services	621-23
Other nonmanufacturing	56, 61, 624, 71, 72, 81
Small nonmanufacturing companies [1]	Fewer than 15 employees

See explanatory information and SOURCE at end of table.

nce in the U.S. as a percent of net sales of companies that ked by size of non-Federally funded R&D program: 1999

Company and other non-Federal R&D funds			Company and other non-Federal R&D funds as a percent of net sales		
First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
[In millions of dollars]			[Percent]		
4,350	978	1,609	20.1	27.8	9.7
(S) 193	18	2	1.6	0.4	4.8
4,350	978	1,593	20.1	27.8	10.4
745	257	123	0.5	0.3	0.5
(D)	0	0	1.1	0.0	0.0
745	236	(S) 30	0.5	0.2	0.5
15	0	0	8.4	0.0	0.0
1,284	208	170	9.0	6.6	4.5
688	338	200	1.7	0.6	0.2
1,298	664	1,264	14.0	31.2	30.4
396	82	161	11.8	5.6	8.2
591	308	482	23.1	4.0	13.4
1,298	543	826	14.0	47.6	54.3
169	48	51	9.8	0.7	0.8
22	1	(D)	4.4	0.2	0.0
(D)	2	0	6.0	15.5	0.3
245	(S) 81	94	2.4	5.0	0.6
53	14	4	48.2	26.3	30.9

Table A-23. **Company and other non-Federal funds for industrial R&D performar performed industrial R&D in the U.S., by industry and by size of company, rank**

Industry and size of company	
Distribution by size of company: [Number of employees]	
Total	
5 to 24	
25 to 49	
50 to 99	
100 to 249	
250 to 499	
500 to 999	
1,000 to 4,999	
5,000 to 9,999	
10,000 to 24,999	
25,000 or more	

[1] The frame from which the statistical sample was selected was divided into two partitions based on to included in the large company partition. In the nonmanufacturing sector, companies with employmer employment below these values, but with at least 5 employees, were included in the small company largely attributed to the random year-to-year selection of small companies by industry and the high s possible only from the large company partition; detailed industry statistics from the small company pa in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classi (SIC) system.

The R&D in this table is the industrial R&D performed within company facilities funded fror funds from outside organizations such as other companies, research institutions, universiti funded R&D not performed within the company (e.g., R&D contracted out to other organiz foreign subsidiaries or other foreign organizations).

Rankings were based on company and other R&D funds.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial

ce in the U.S. as a percent of net sales of companies that ed by size of non-Federally funded R&D program: 1999

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Company and other non-Federal R&D funds			Company and other non-Federal R&D funds as a percent of net sales		
First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
	[In millions of dollars]			[Percent]	
17,286	12,621	18,735	5.7	15.2	5.6
70	33	35	58.6	96.6	78.0
79	46	110	48.9	63.7	106.0
104	85	203	146.3	220.6	90.5
200	169	369	106.2	115.6	27.7
427	311	608	38.6	81.8	42.5
764	370	629	52.5	31.6	16.4
1,789	1,132	2474	22.9	11.6	22.1
2,185	1,734	3247	16.2	10.1	13.0
7,040	3,758	5719	18.6	11.5	7.5
17,286	11,976	16200	5.7	8.3	5.4

tal company employment. In the manufacturing sector, companies with employment of 50 or more were
t of 15 or more were included in the large company partition. Companies in the respective sectors with
partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates
ampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were
rtition were not possible. Statistics from the small company partition are shown separately and are included
see "frame creation" and "sample selection" in Section B.

fication System (NAICS). In prior years, estimates were based on the Standard Industrial Classification

all sources except the Federal Government. The funds predominantly are the company's own, but also include
es and colleges, nonprofit organizations, and State governments. Excluded from this table are non-Federally
ations) and non-Federally funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by

Table A-24. **Federal funds for industrial R&D performance in the U.S. as a per by industry and by size of company, ranked by size of federally-funded R&D**

Industry and size of company	NAICS codes
Distribution by industry:	
All industries	21-23, 31-33, 42, 44-
Manufacturing	31-
Food	3
Beverage and tobacco products	3
Textiles, apparel, and leather	313-
Wood products	3
Paper, printing and support activities	322, 3
Petroleum and coal products	3
Chemicals	3
Basic chemicals	32
Resin, synthetic rubber, fibers, and filament	32
Pharmaceuticals and medicines	32
Other chemicals	325 (minus 3251-52, 32
Plastics and rubber products	3
Nonmetallic mineral products	3
Primary metals	3
Fabricated metal products	3
Machinery	3
Computer and electronic products	3
Computers and peripheral equipment	33
Communications equipment	33
Semiconductor and other electronic components	33
Navigational, measuring, electromedical, and control instruments	33
Other computer and electronic products	334 (minus 3341-42, 3344-
Electrical equipment, appliances, and components	3
Transportation equipment	3
Motor vehicles, trailers, and parts	3361-
Aerospace products and parts	33
Other transportation equipment	336 (minus 3361-

See explanatory information and SOURCE at end of table.

cent of net sales of companies that performed industrial R&D in the U.S., program: 1999

	Federal R&D funds			Federal R&D funds as a percent of net sales		
	First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
	[In millions of dollars]			[Percent]		
31	10,622	3,223	3,315	17.6	4.0	2.5
33	10,622	(D)	(D)	17.6	2.9	1.0
11	0	0	0	0.0	0.0	0.0
12	0	0	0	0.0	0.0	0.0
16	0	0	0	0.0	0.0	0.0
21	0	0	0	0.1	0.0	0.0
23	(D)	0	0	0.2	0.0	0.0
24	(D)	0	0	0.0	0.0	0.0
25	162	17	15	1.1	0.1	0.0
51	89	7	1	0.7	0.1	0.0
52	(D)	0	0	0.0	0.0	0.0
54	(D)	0	0	2.6	0.0	0.0
54)	(D)	0	0	0.5	0.0	0.0
26	0	0	0	0.0	0.0	0.0
27	(D)	0	0	0.0	0.0	0.0
31	12	(D)	0	0.1	0.0	0.0
32	23	2	0	0.8	0.0	0.0
33	(S) 342	7	1	1.5	0.2	0.0
34	5,274	333	203	22.6	1.3	3.2
41	(D)	0	0	0.4	0.0	0.0
42	203	3	0	1.1	0.1	0.0
44	19	6	0	0.5	0.0	0.0
45	5,274	259	70	22.6	3.4	0.8
15)	(D)	0	0	0.1	0.0	0.0
35	(D)	(D)	0	0.3	0.0	0.0
36	7,295	1,542	1,114	7.0	3.7	0.7
63	202	1	0	0.1	0.0	0.0
64	7,295	1,542	279	7.0	3.7	2.0
4)	639	29	0	4.4	0.6	0.0

Table A-24 **Federal funds for industrial R&D performance in the U.S. as a perc by industry and by size of company, ranked by size of federally-funded R&D p**

Industry and size of company	NAICS codes
Distribution by industry:	
Furniture and related products	33
Miscellaneous manufacturing	33
Medical equipment and supplies	339
Other miscellaneous manufacturing	339 (minus 339
Other manufacturing	31-33 (minus 311-16, 321-2 331-37, 33
Small manufacturing companies[1]	Fewer than 50 employee
Nonmanufacturing	21-23, 42, 44-8
Mining, extraction, and support activities	2
Utilities	2
Construction	2
Trade	42, 44, 4
Transportation and warehousing	48, 4
Information	5
Publishing	51
Newspaper, periodical, book, and database	51
Software	51
Broadcasting and telecommunications	5
Radio and television broadcasting	51
Telecommunications	51
Other broadcasting and telecommunications	513 (minus 5131, 513
Other information	51 (minus 511, 51
Finance, insurance, and real estate	52, 5
Professional, scientific, and technical services	5
Architectural, engineering, and related services	54
Computer systems design and related services	54
Scientific R&D services	54
Other professional, scientific, and technical services	54 (minus 5413, 5415, 541

See explanatory information and SOURCE at end of table.

rcent of net sales of companies that performed industrial R&D in the U.S.,
program: 1999

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	Federal R&D funds			Federal R&D funds as a percent of net sales		
	First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
	[In millions of dollars]			[Percent]		
337	0	0	0	0.0	0.0	0.0
339	10	(D)	0	5.6	0.0	0.0
391	10	(D)	0	5.6	0.0	0.0
91)	(D)	0	0	0.0	0.0	0.0
-27, 39)	--	--	--	--	--	--
ees	1	0	0	0.2	1.4	0.0
-81	2,058	491	482	14.4	1.9	44.3
21	(D)	0	0	0.0	0.0	0.0
22	15	0	0	0.1	0.0	0.0
23	2	0	0	0.0	0.0	0.0
, 45	65	3	1	0.1	0.1	0.0
, 49	0	0	0	0.0	0.0	0.0
51	(S) 441	16	8	1.0	6.2	0.0
511	22	6	0	2.5	4.5	0.0
111	0	0	0	0.0	0.0	0.0
112	22	6	0	2.5	4.5	0.0
513	(S) 411	(D)	0	0.4	0.0	0.0
131	(D)	0	0	2.5	0.0	0.0
133	(D)	0	0	0.2	0.0	0.0
33)	1	0	0	0.8	0.0	0.0
13)	(D)	0	0	0.2	0.0	0.0
, 53	(D)	0	0	0.0	0.0	0.0
54	1,954	311	401	28.3	13.5	49.0
413	549	108	162	21.1	59.9	2.7
415	98	27	31	15.2	135.0	0.5
417	1,711	154	254	26.3	33.3	75.3
17)	(D)	0	0	6.6	0.0	0.0

Table A-24. **Federal funds for industrial R&D performance in the U.S. as a percent of net sales of companies that performed industrial R&D in the U.S., by industry and by size of company, ranked by size of federally-funded R&D program: 1999**

Page 3 of 3

Industry and size of company	NAICS codes	Federal R&D funds			Federal R&D funds as a percent of net sales		
		First 4 companies	Next 4 companies	Next 12 companies	First 4 companies	Next 4 companies	Next 12 companies
		[In millions of dollars]			[Percent]		
Distribution by industry							
Management of companies and enterprises	55	(D)	0	0	0.1	0.0	0.0
Health care services	621-23	8	0	0	0.1	0.0	0.0
Other nonmanufacturing	56, 61, 624, 71, 72, 81	(D)	0	0	1.0	0.0	0.0
Small nonmanufacturing companies[1]	Fewer than 15 employees	1	0	0	34.4	0.0	0.0
Distribution by size of company: [Number of employees]							
Total		10,622	3,223	3,315	17.6	4.0	2.5
5 to 24		15	9	16	110.0	57.3	55.2
25 to 49		23	17	34	97.1	90.2	57.0
50 to 99		57	38	76	71.7	81.2	91.1
100 to 249		102	74	123	93.6	70.0	68.1
250 to 499		163	100	149	66.4	59.2	31.7
500 to 999		258	146	117	61.2	28.4	8.8
1,000 to 4,999		536	133	103	25.9	15.4	1.4
5,000 to 9,999		1,708	422	59	30.6	11.4	0.3
10,000 to 24,999		324	46	27	2.4	0.3	0.0
25,000 or more		10,622	2,817	2,176	17.6	3.2	0.7

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

Rankings were based on Federal R&D funds.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-25. **Trends in total (Federal plus company and other) funds for performance of industrial basic research, applied research, and development in the U.S., in current and in constant dollars: 1953-99**

Page 1 of 2

Year	Total		Basic research		Applied research		Development	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]							
1953 [1]	3,630	18,857	151	784	726	3,771	2,753	14,301
1954 [1]	4,070	20,936	166	854	814	4,187	3,090	15,895
1955 [1]	4,640	23,458	189	956	928	4,692	3,523	17,811
1956	6,605	32,298	253	1,237	1,268	6,200	5,084	24,861
1957	7,731	36,588	271	1,283	1,670	7,903	5,790	27,402
1958	8,389	38,766	295	1,363	1,911	8,831	6,183	28,572
1959	9,618	43,958	320	1,463	1,991	9,100	7,307	33,396
1960	10,509	47,359	376	1,694	2,029	9,144	8,104	36,521
1961	10,908	48,610	395	1,760	1,977	8,810	8,536	38,039
1962	11,464	50,413	488	2,146	2,449	10,770	8,527	37,498
1963	12,630	54,913	522	2,270	2,457	10,683	9,651	41,961
1964	13,512	57,892	549	2,352	2,600	11,140	10,363	44,400
1965	14,185	59,651	592	2,489	2,658	11,177	10,935	45,984
1966	15,548	63,565	624	2,551	2,843	11,623	12,081	49,391
1967	16,385	64,994	629	2,495	2,915	11,563	12,841	50,936
1968	17,429	66,270	642	2,441	3,124	11,878	13,663	51,951
1969	18,308	66,357	618	2,240	3,287	11,914	14,403	52,204
1970	18,067	62,171	602	2,072	3,427	11,793	14,038	48,307
1971	18,320	60,026	590	1,933	3,415	11,189	14,315	46,904
1972	19,552	61,446	593	1,864	3,514	11,043	15,445	48,539
1973	21,249	63,241	631	1,878	3,825	11,384	16,793	49,979
1974	22,887	62,499	699	1,909	4,288	11,709	17,900	48,880
1975	24,187	60,422	730	1,824	4,570	11,416	18,887	47,182
1976	26,997	63,823	819	1,936	5,112	12,085	21,066	49,801
1977	29,825	66,248	911	2,024	5,636	12,519	23,278	51,706
1978 [1]	33,304	69,052	1,035	2,146	6,300	13,062	25,969	53,844
1979	38,226	73,160	1,158	2,216	7,225	13,828	29,843	57,116
1980 [1]	44,505	78,024	1,325	2,323	8,450	14,814	34,730	60,887
1981	51,810	83,069	1,614	2,588	10,699	17,154	39,497	63,327
1982 [1]	58,650	88,528	1,904	2,874	12,323	18,601	44,423	67,054
1983	65,268	94,756	2,223	3,227	13,927	20,219	49,118	71,310
1984	74,800	104,703	2,608	3,651	15,765	22,067	56,427	78,985
1985	84,239	114,315	2,862	3,884	18,255	24,773	63,122	85,659
1986	87,823	116,615	4,047	5,374	19,759	26,237	64,017	85,005
1987	92,155	118,787	4,324	5,574	19,813	25,539	68,018	87,675
1988 [2]	97,015	120,951	4,500	5,610	20,748	25,867	71,767	89,474
1989 [2]	102,055	122,559	5,216	6,264	22,691	27,250	74,148	89,045
1990 [2]	109,727	126,837	5,128	5,928	24,785	28,650	79,814	92,260
1991 [2,3]	116,952	130,439	7,837	8,741	27,446	30,611	81,669	91,087
1992 [3]	119,110	129,693	7,002	7,624	26,168	28,493	85,940	93,576
1993 [3]	117,400	124,827	6,919	7,357	24,686	26,248	85,796	91,224
1994 [3]	119,595	124,565	7,017	7,309	23,490	24,466	89,088	92,790

See explanatory information and SOURCE at end of table.

Table A-25. **Trends in total (Federal plus company and other) funds for performance of industrial basic research, applied research, and development in the U.S., in current and in constant dollars: 1953-99**

Page 2 of 2

Year	Total		Basic research		Applied research		Development	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]							
1995 [3]	132,103	134,662	6,099	6,217	27,454	27,986	98,552	100,461
1996 [3]	144,667	144,667	8,207	8,207	29,241	29,241	107,218	107,218
1997 [3]	157,539	154,526	10,419	10,220	32,642	32,018	114,478	112,288
1998 [3]	169,180	163,902	13,595	13,171	30,572	29,618	125,013	121,113
1999 [3]	182,823	174,499	15,454	14,750	35,641	34,018	131,728	125,731

[1] Character-of-work estimates were made by the National Science Foundation. See National Science Foundation, *National Patterns of R&D Resources: 1998*, NSF 99-335.

[2] As a result of a new sample design, statistics for 1988-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries.

[3] As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years. See the technical notes for more information.

NOTES: The character-of-work estimation procedure was revised for 1986 and later years; hence, these data are not directly comparable with data for 1985 and earlier years. See the technical notes for a more complete discussion of this change.

Gross domestic product (GDP) implicit price deflators were used to convert current dollars to constant (1996) dollars.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-26. **Trends in company and other non-Federal funds for performance of industrial basic research, applied research, and development in the U.S., in current and in constant dollars: 1953-99**

Page 1 of 2

Year	Total		Basic research		Applied research		Development	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]							
1953 [1]	2,200	11,429	132	686	438	2,275	1,630	8,468
1954 [1]	2,320	11,934	143	736	492	2,531	1,685	8,668
1955 [1]	2,460	12,437	162	819	560	2,831	1,738	8,787
1956	3,277	16,024	216	1,056	794	3,883	2,267	11,086
1957	3,396	16,072	230	1,088	992	4,695	2,174	10,289
1958	3,630	16,774	252	1,165	1,137	5,254	2,241	10,356
1959	3,983	18,204	248	1,133	1,178	5,384	2,557	11,686
1960	4,428	19,955	297	1,338	1,196	5,390	2,935	13,227
1961	4,668	20,802	314	1,399	1,165	5,192	3,189	14,211
1962	5,029	22,115	345	1,517	1,438	6,324	3,246	14,274
1963	5,360	23,304	375	1,630	1,450	6,304	3,535	15,370
1964	5,792	24,816	384	1,645	1,560	6,684	3,848	16,487
1965	6,445	27,103	406	1,707	1,620	6,812	4,419	18,583
1966	7,216	29,501	451	1,844	1,804	7,375	4,961	20,282
1967	8,020	31,813	427	1,694	1,849	7,334	5,744	22,785
1968	8,869	33,722	462	1,757	2,081	7,913	6,326	24,053
1969	9,857	35,727	458	1,660	2,272	8,235	7,127	25,832
1970	10,288	35,403	444	1,528	2,378	8,183	7,466	25,692
1971	10,654	34,908	456	1,494	2,441	7,998	7,757	25,416
1972	11,535	36,251	463	1,455	2,562	8,052	8,510	26,744
1973	13,104	39,000	499	1,485	2,832	8,429	9,773	29,086
1974	14,667	40,052	536	1,464	3,263	8,910	10,868	29,678
1975	15,582	38,926	573	1,431	3,440	8,594	11,569	28,901
1976	17,436	41,220	634	1,499	3,912	9,248	12,890	30,473
1977	19,340	42,959	701	1,557	4,311	9,576	14,328	31,826
1978 [1]	22,115	45,853	785	1,628	4,870	10,097	16,460	34,128
1979	25,708	49,202	893	1,709	5,670	10,852	19,145	36,641
1980 [1]	30,476	53,429	1,035	1,815	6,550	11,483	22,891	40,131
1981	35,428	56,803	1,313	2,105	8,359	13,402	25,756	41,295
1982 [1]	40,105	60,536	1,523	2,299	9,363	14,133	29,219	44,104
1983	44,588	64,733	1,760	2,555	10,286	14,933	32,542	47,244
1984	51,404	71,954	2,132	2,984	11,541	16,155	37,731	52,815
1985	57,043	77,409	2,373	3,220	12,908	17,517	41,762	56,673
1986	59,932	79,580	3,496	4,642	15,082	20,027	41,354	54,912
1987	61,403	79,148	3,583	4,618	15,153	19,532	42,667	54,997
1988 [2]	66,672	83,122	3,507	4,372	16,531	20,610	46,634	58,140
1989 [2]	73,501	88,268	3,832	4,602	17,993	21,608	51,676	62,058
1990 [2]	81,602	94,327	3,760	4,346	18,432	21,306	59,410	68,674
1991 [2,3]	90,580	101,026	6,125	6,831	21,425	23,896	63,030	70,299
1992 [3]	94,388	102,774	5,816	6,333	21,184	23,066	67,385	73,372
1993 [3]	94,591	100,575	5,961	6,338	19,956	21,219	68,678	73,023
1994 [3]	97,131	101,168	6,078	6,331	19,372	20,177	71,683	74,662

See explanatory information and SOURCE at end of table.

Table A-26. **Trends in company and other non-Federal funds for performance of industrial basic research, applied research, and development in the U.S., in current and in constant dollars: 1953-99**

Page 2 of 2

Year	Total		Basic research		Applied research		Development	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]							
1995 [3]	108,652	110,756	5,379	5,483	23,755	24,215	79,516	81,056
1996 [3]	121,015	121,015	6,848	6,848	25,370	25,370	88,798	88,798
1997 [3]	133,611	131,055	8,766	8,598	29,782	29,212	95,064	93,246
1998 [3]	145,016	140,492	11,701	11,336	27,808	26,941	105,506	102,215
1999 [3]	160,288	152,990	12,813	12,230	31,927	30,473	115,549	110,288

[1] Character-of-work estimates were made by the National Science Foundation. See National Science Foundation, *National Patterns of R&D Resources: 1998*, NSF 99-335.

[2] As a result of a new sample design, statistics for 1988-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries.

[3] As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years. See the technical notes for more information.

NOTES: The character-of-work estimation procedure was revised for 1986 and later years; hence, these data are not directly comparable with data for 1985 and earlier years. See the technical notes for a more complete discussion of this change.

Company-funded R&D includes funds for industrial R&D performed within company facilities from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Company-financed R&D not performed within the company is excluded.

Gross domestic product (GDP) implicit price deflators were used to convert current dollars to constant (1996) dollars.

The R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-27. **Trends in Federal funds for performance of industrial basic research, applied research, and development, in the U.S., in current and in constant dollars: 1953-99**

Page 1 of 2

Year	Total		Basic research		Applied research		Development	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]							
1953 [1]	1,430	7,429	19	99	288	1,496	1,123	5,834
1954 [1]	1,750	9,002	23	118	322	1,656	1,405	7,227
1955 [1]	2,180	11,021	27	137	368	1,860	1,785	9,024
1956	3,328	16,274	37	181	474	2,318	2,817	13,775
1957	4,335	20,516	41	194	678	3,209	3,616	17,113
1958	4,759	21,992	43	199	774	3,577	3,942	18,216
1959	5,635	25,754	72	329	813	3,716	4,750	21,709
1960	6,081	27,404	79	356	833	3,754	5,169	23,294
1961	6,240	27,807	81	361	812	3,619	5,347	23,828
1962	6,434	28,294	143	629	1,011	4,446	5,281	23,223
1963	7,270	31,609	147	639	1,007	4,378	6,116	26,591
1964	7,720	33,076	165	707	1,040	4,456	6,515	27,913
1965	7,740	32,548	186	782	1,038	4,365	6,516	27,401
1966	8,332	34,064	173	707	1,039	4,248	7,120	29,109
1967	8,365	33,181	202	801	1,066	4,228	7,097	28,152
1968	8,560	32,548	180	684	1,043	3,966	7,337	27,897
1969	8,451	30,631	160	580	1,015	3,679	7,276	26,372
1970	7,779	26,769	158	544	1,049	3,610	6,572	22,615
1971	7,666	25,118	134	439	974	3,191	6,558	21,488
1972	8,017	25,195	130	409	952	2,992	6,935	21,794
1973	8,145	24,241	132	393	993	2,955	7,020	20,893
1974	8,220	22,447	163	445	1,025	2,799	7,032	19,203
1975	8,605	21,496	157	392	1,130	2,823	7,318	18,281
1976	9,561	22,603	185	437	1,200	2,837	8,176	19,329
1977	10,485	23,290	210	466	1,325	2,943	8,950	19,880
1978 [1]	11,189	23,199	250	518	1,430	2,965	9,509	19,716
1979	12,518	23,958	265	507	1,555	2,976	10,698	20,475
1980 [1]	14,029	24,595	290	508	1,900	3,331	11,839	20,756
1981	16,382	26,266	301	483	2,340	3,752	13,741	22,031
1982 [1]	18,545	27,992	381	575	2,960	4,468	15,204	22,949
1983	20,680	30,023	463	672	3,641	5,286	16,576	24,065
1984	23,396	32,749	476	666	4,224	5,913	18,696	26,170
1985	27,196	36,906	489	664	5,347	7,256	21,360	28,986
1986	27,891	37,035	551	732	4,678	6,212	22,662	30,092
1987	30,752	39,639	740	954	4,660	6,007	25,352	32,679
1988 [2]	30,343	37,829	993	1,238	4,217	5,257	25,133	31,334
1989 [2]	28,554	34,291	1,384	1,662	4,698	5,642	22,472	26,987
1990 [2]	28,125	32,511	1,368	1,581	6,353	7,344	20,404	23,586
1991 [2,3]	26,372	29,413	1,712	1,909	6,021	6,715	18,639	20,789
1992 [3]	24,722	26,919	1,186	1,291	4,983	5,426	18,555	20,204
1993 [3]	22,809	24,252	958	1,019	4,730	5,029	17,118	18,201
1994 [3]	22,463	23,397	939	978	4,119	4,290	17,405	18,128

See explanatory information and SOURCE at end of table.

Table A-27. **Trends in Federal funds for performance of industrial basic research, applied research, and development, in the U.S., in current and in constant dollars: 1953-99**

Page 2 of 2

Year	Total		Basic research		Applied research		Development	
	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars	Current dollars	Constant 1996 dollars
	[In millions of dollars]							
1995 [3]	23,451	23,905	720	734	3,699	3,771	19,031	19,400
1996 [3]	23,653	23,653	1,358	1,358	3,871	3,871	(S) 18,423	(S) 18,423
1997 [3]	23,928	23,470	1,654	1,622	2,861	2,806	19,412	19,041
1998 [3]	24,164	23,410	1,894	1,835	2,763	2,677	19,507	18,898
1999 [3]	22,535	21,509	2,641	2,521	3,714	3,545	16,179	15,442

[1] Character-of-work estimates were made by the National Science Foundation. See National Science Foundation, *National Patterns of R&D Resources: 1998*, NSF 99-335.

[2] As a result of a new sample design, statistics for 1988-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries.

[3] As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years. See the technical notes for more information.

KEY: (S) = Indicates imputation of more than 50 percent.

NOTES: The character-of-work estimation procedure was revised for 1986 and later years; hence, these data are not directly comparable with data for 1985 and earlier years. See the technical notes for a more complete discussion of this change.

Gross domestic product (GDP) implicit price deflators were used to convert current dollars to constant (1996) dollars.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-28 **Funds for performance of and number of companies that performed in by industry, by source of funds: 1999**

Industry and size of company	NAICS codes
Distribution by industry:	
All industries	21-23, 31-33, 42, 44-81
Manufacturing	31-33
Food	311
Beverage and tobacco products	312
Textiles, apparel, and leather	313-16
Wood products	321
Paper, printing and support activities	322, 323
Petroleum and coal products	324
Chemicals	325
Basic chemicals	3251
Resin, synthetic rubber, fibers, and filament	3252
Pharmaceuticals and medicines	3254
Other chemicals	325 (minus 3251-52, 3254)
Plastics and rubber products	326
Nonmetallic mineral products	327
Primary metals	331
Fabricated metal products	332
Machinery	333
Computer and electronic products	334
Computers and peripheral equipment	3341
Communications equipment	3342
Semiconductor and other electronic components	3344
Navigational, measuring, electromedical, and control instruments	3345
Other computer and electronic products	334 (minus 3341-42, 3344-45)
Electrical equipment, appliances, and components	335
Transportation equipment	336

See explanatory information and SOURCE at end of table.

dustrial basic research, applied research, and development in the U.S.,

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Total				Basic research			
mber of mpanies	Total	Federal	Company	Number of companies	Total	Federal	Company
	[In millions of dollars]				[In millions of dollars]		
39,005	182,823	22,535	160,288	14,186	15,454	2,641	12,813
18,059	116,921	17,055	99,865	6,544	(D)	(D)	7,634
526	1,132	0	1,132	287	33	0	33
6	(D)	0	(D)	1	(D)	0	(D)
441	334	0	334	287	62	0	62
145	70	0	70	76	20	0	20
195	(D)	(D)	2,474	76	199	0	199
61	615	(D)	(D)	52	63	(D)	(D)
847	20,246	194	20,051	182	3,300	74	3,226
137	2,746	98	2,648	64	(D)	(D)	(D)
14	(D)	(D)	2,216	6	(D)	52	(D)
175	(D)	(D)	12,236	15	2,234	0	2,234
522	(D)	(D)	2,951	97	(D)	(D)	193
679	1,785	0	1,785	277	182	0	182
237	(D)	(D)	595	108	(D)	(D)	33
208	470	12	457	15	(D)	(D)	(D)
1,202	1,655	46	1,608	418	165	0	165
1,466	6,057	(S) 399	5,658	463	(D)	(D)	391
1,157	35,932	5,993	29,939	258	2,175	110	2,065
120	(D)	(D)	4,126	30	166	0	166
163	6,003	206	5,797	58	(D)	(D)	270
441	10,701	77	10,624	80	501	1	499
280	14,337	5,705	8,632	66	1,081	101	980
154	(D)	(D)	760	24	(D)	(D)	150
384	(D)	(D)	3,820	116	(D)	(D)	344
450	33,965	10,037	23,928	96	(D)	(D)	507

Table A-28. **Funds for performance of and number of companies that performed industrial basic research, applied research, and development in the U.S., by industry, by source of funds: 1999**

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Industry and size of company	NAICS codes	Total				Basic research			
		Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
			[In millions of dollars]				[In millions of dollars]		
Distribution by industry									
Motor vehicles, trailers, and parts	3361-63	306	(D)	(D)	17,987	55	(D)	(D)	250
Aerospace products and parts	3364	24	14,425	9,117	5,309	8	(D)	(D)	173
Other transportation equipment	336 (minus 3361-64)	120	(D)	(D)	632	33	85	0	85
Furniture and related products	337	205	248	0	248	56	36	0	36
Miscellaneous manufacturing	339	549	3,851	26	3,825	177	157	1	156
Medical equipment and supplies	3391	264	(D)	(D)	3,251	95	100	1	99
Other miscellaneous manufacturing	339 (minus 3391)	284	(D)	(D)	574	82	57	0	57
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--
Small manufacturing companies [1]	Fewer than 50 employees	9,300	3,019	69	2,950	3,600	133	15	118
Nonmanufacturing	21-23, 42, 44-81	20,946	65,902	5,479	60,423	7,642	(D)	(D)	5,179
Mining, extraction, and support activities	21	217	(D)	(D)	2,352	4	32	0	32
Utilities	22	58	142	17	126	12	(S) 7	0	(S) 7
Construction	23	558	691	2	690	203	(D)	(D)	50
Trade	42, 44, 45	2,671	19,616	95	19,521	919	785	20	765
Transportation and warehousing	48, 49	127	460	0	460	61	192	0	192
Information	51	1,690	15,389	497	14,892	302	1,213	7	1,206
Publishing	511	1,302	11,302	49	11,253	228	(D)	(D)	(D)
Newspaper, periodical, book, and database	5111	155	371	0	371	2	(D)	(D)	(D)
Software	5112	1,147	10,931	49	10,882	226	807	3	804
Broadcasting and telecommunications	513	84	(D)	(D)	1,393	60	(D)	(D)	(D)
Radio and television broadcasting	5131	51	(D)	(D)	(D)	50	(D)	(D)	1
Telecommunications	5133	15	(D)	(D)	(D)	3	(D)	0	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	18	31	13	18	7	(D)	0	(D)

See explanatory information and SOURCE at end of table.

Table A-28. **Funds for performance of and number of companies that performed indus by industry, by source of funds: 1999**

Industry and size of company	NAICS codes	Numbe compa
Distribution by industry:		
Other information	51 (minus 511, 513)	
Finance, insurance, and real estate	52, 53	
Professional, scientific, and technical services	54	
Architectural, engineering, and related services	5413	
Computer systems design and related services	5415	
Scientific R&D services	5417	
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	
Management of companies and enterprises	55	
Health care services	621-23	
Other nonmanufacturing	56, 61, 624, 71, 72, 81	
Small nonmanufacturing companies [1]	Fewer than 15 employees	1
Distribution by size of company [Number of employees]		
Total		3
5 to 24		1
25 to 49		
50 to 99		
100 to 249		
250 to 499		
500 to 999		
1,000 to 4,999		
5,000 to 9,999		
10,000 to 24,999		
25,000 or more		

See explanatory information and SOURCE at end of table.

strial basic research, applied research, and development in the U.S.,

Page 3 of 6

Total				Basic research			
ber of panies	Total	Federal	Company	Number of companies	Total	Federal	Company
	[In millions of dollars]				[In millions of dollars]		
303	(D)	(D)	2,246	14	337	0	337
258	(D)	(D)	1,570	69	(D)	(D)	48
3,968	18,994	4,615	14,379	1,030	3,077	781	2,295
1,045	3,580	1,177	2,402	225	334	171	162
1,653	(D)	(D)	3,989	363	(D)	(D)	499
913	10,470	3,057	7,413	323	2,015	542	1,473
356	(D)	(D)	575	120	(D)	(D)	161
28	(D)	(D)	72	2	13	0	13
405	642	10	631	251	250	2	247
966	(D)	(D)	752	539	(D)	(D)	156
10,002	5,203	227	4,977	4,249	167	1	166
39,005	182,823	22,535	160,288	14,186	15,454	2,641	12,813
18,355	7,004	611	6,393	7,073	488	26	462
6,749	4,750	368	4,382	2,712	634	166	468
5,102	7,225	603	6,623	1,497	822	94	728
4,083	7,213	674	6,540	1,339	897	118	778
1,788	7,892	485	7,407	753	(D)	(D)	922
1,118	7,032	591	6,441	372	(D)	(D)	1,163
1,157	24,840	896	23,944	244	2,088	75	2,013
288	16,376	2,194	14,182	69	(D)	(D)	684
198	24,922	397	24,525	45	(D)	(D)	3,107
167	75,569	15,717	59,852	82	(D)	(D)	2,486

Table A-28. **Funds for performance of and number of companies that performed industrial basic research, applied research, and development in the U.S., by industry, by source of funds: 1999**

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Industry and size of company	NAICS codes	Applied research				Development			
		Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
			[In millions of dollars]				[In millions of dollars]		
Distribution by industry:									
All industries	21-23, 31-33, 42, 44-81	14,369	35,641	3,714	31,927	26,455	131,728	16,179	115,549
Manufacturing	31-33	7,445	(D)	(D)	23,150	12,504	82,510	13,448	69,062
Food	311	217	253	0	253	328	846	0	846
Beverage and tobacco products	312	2	(D)	0	(D)	5	213	0	213
Textiles, apparel, and leather	313-16	162	50	0	50	271	221	0	221
Wood products	321	28	(D)	(D)	18	117	(D)	(D)	33
Paper, printing and support activities	322, 323	83	831	0	831	66	(D)	(D)	1,490
Petroleum and coal products	324	57	181	0	181	57	371	0	371
Chemicals	325	328	5,330	76	5,254	610	11,898	96	11,802
Basic chemicals	3251	63	(D)	(D)	(D)	92	1,206	51	1,155
Resin, synthetic rubber, fibers, and filament	3252	8	(D)	(D)	(D)	10	(D)	(D)	1,259
Pharmaceuticals and medicines	3254	26	(D)	(D)	2,522	117	(D)	(D)	7,480
Other chemicals	325 (minus 3251-52, 3254)	232	(D)	(D)	851	391	(D)	(D)	1,907
Plastics and rubber products	326	301	311	0	311	477	1,292	0	1,292
Nonmetallic mineral products	327	112	(D)	(D)	185	181	(D)	(D)	378
Primary metals	331	98	(D)	(D)	(D)	87	198	4	194
Fabricated metal products	332	649	283	6	277	1,019	1,209	40	1,169
Machinery	333	488	(D)	(D)	789	1,013	4,825	347	4,478
Computer and electronic products	334	599	9,766	164	9,602	937	23,992	5,717	18,274
Computers and peripheral equipment	3341	27	(D)	(D)	2,409	66	(D)	(D)	(S) 1,552
Communications equipment	3342	67	(D)	(D)	1,320	132	(D)	(D)	4,208
Semiconductor and other electronic components	3344	245	4,147	28	4,118	401	6,055	48	6,008
Navigational, measuring, electromedical, and control instruments	3345	141	1,744	101	1,643	190	11,509	5,502	6,007
Other computer and electronic products	334 (minus 3341-42, 3344-45)	119	(D)	(D)	(S) 112	148	500	0	500
Electrical equipment, appliances, and components	335	133	(D)	(D)	784	289	(D)	(D)	2,694
Transportation equipment	336	220	4,470	949	3,519	332	(D)	(D)	19,903
Motor vehicles, trailers, and parts	3361-63	162	(D)	(D)	2,762	221	(D)	(D)	14,976
Aerospace products and parts	3364	13	(D)	(D)	655	17	11,541	7,060	4,480
Other transportation equipment	336 (minus 3361-64)	45	(D)	(D)	101	94	(D)	(D)	447

See explanatory information and SOURCE at end of table.

Table A-28. **Funds for performance of and number of companies that performed industrial basic research, applied research, and development in the U.S., by industry, by source of funds: 1999**

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Industry and size of company	NAICS codes	Applied research				Development			
		Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
			[In millions of dollars]				[In millions of dollars]		
Distribution by industry:									
Furniture and related products	337	42	16	0	16	140	196	0	196
Miscellaneous manufacturing	339	226	290	4	286	375	3,403	21	3,383
Medical equipment and supplies	3391	118	(D)	(D)	195	177	2,980	21	2,959
Other miscellaneous manufacturing	339 (minus 3391)	107	(D)	(D)	91	198	426	0	426
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--
Small manufacturing companies [1]	Fewer than 50 employees	3,700	405	35	369	6,200	2,480	19	2,462
Nonmanufacturing	21-23, 42, 44-81	6,924	(D)	(D)	8,777	13,951	49,218	2,731	46,487
Mining, extraction, and support activities	21	114	(D)	(D)	171	214	2,149	0	2,149
Utilities	22	23	37	0	37	30	98	17	81
Construction	23	202	22	0	22	255	(D)	(D)	618
Trade	42, 44, 45	1,005	2,144	60	2,084	1,534	16,689	15	16,674
Transportation and warehousing	48, 49	103	118	0	118	124	149	0	149
Information	51	473	2,475	114	2,361	1,294	11,699	(S) 364	11,311
Publishing	511	386	(D)	(D)	(D)	1,000	8,686	23	8,663
Newspaper, periodical, book, and database	5111	99	(D)	(D)	(D)	103	294	0	294
Software	5112	287	1,730	22	1,708	898	8,392	23	8,368
Broadcasting and telecommunications	513	15	(D)	(D)	(D)	20	(D)	(D)	870
Radio and television broadcasting	5131	1	(D)	(D)	0	2	(D)	(D)	(D)
Telecommunications	5133	6	(D)	(D)	(D)	9	(D)	(D)	748
Other broadcasting and telecommunications	513 (minus 5131, 5133)	8	9	0	9	9	(D)	0	(D)
Other information	51 (minus 511, 513)	72	109	0	109	274	(D)	(D)	1,800
Finance, insurance, and real estate	52, 53	21	33	0	33	193	1,489	0	1,489
Professional, scientific, and technical services	54	1,444	5,075	1,575	3,500	2,753	10,844	2,259	8,584
Architectural, engineering, and related services	5413	316	657	367	291	650	2,589	639	1,950
Computer systems design and related services	5415	408	(D)	(D)	548	1,246	3,168	226	2,942
Scientific R&D services	5417	514	3,639	1,121	2,519	575	4,817	1,394	3,422
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	206	(D)	(D)	143	282	270	0	270

See explanatory information and SOURCE at end of table.

Table A-28. **Funds for performance of and number of companies that performed industrial basic research, applied research, and development in the U.S., by industry, by source of funds: 1999**

Page 6 of 6

Industry and size of company	NAICS codes	Applied research				Development			
		Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
			[In millions of dollars]				[In millions of dollars]		
Distribution by industry:									
Management of companies and enterprises	55	1	(D)	0	(D)	26	(D)	(D)	(D)
Health care services	621-23	204	(D)	(D)	(D)	53	(D)	(D)	(D)
Other nonmanufacturing	56, 61, 624, 71, 72, 81	335	(D)	(D)	83	471	(D)	(D)	514
Small nonmanufacturing companies [1]	Fewer than 15 employees	3,000	251	155	96	7,003	4,785	71	4,714
Distribution by size of company: [Number of employees]									
Total		14,369	35,641	3,714	31,927	26,455	131,728	16,179	115,549
5 to 24		6,158	791	277	514	12,024	5,725	308	5,417
25 to 49		2,873	927	89	838	4,862	3,189	113	3,076
50 to 99		1,709	1,194	77	1,117	3,607	5,209	432	4,777
100 to 249		1,822	2,072	191	1,880	2,852	4,245	364	3,880
250 to 499		609	(D)	(D)	963	1,068	5,741	220	5,521
500 to 999		447	(D)	(D)	1,502	733	4,122	345	3,778
1,000 to 4,999		498	4,584	185	4,400	879	18,167	636	17,531
5,000 to 9,999		120	(D)	(D)	2,388	218	12,328	1,221	11,107
10,000 to 24,999		83	(D)	(D)	7,946	132	14,648	351	14,297
25,000 or more		50	(D)	(D)	10,380	79	60,684	12,080	48,604

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

The company R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments.

Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-29. **Total, Federal, company and other funds for industrial energy R&D performance in the U.S. and number of companies that performed energy R&D in the U.S., by selected industry and by size of company: 1999 and projected 2000**

Page 1 of 2

Industry	NAICS codes	Number of companies	1999			Projected 2000		
			Total	Federal	Company	Total	Federal	Company
			[In millions of dollars]			[In millions of dollars]		
Distribution by industry								
All industries	21-23, 31-33, 42, 44-81	49	1,830	(D)	(D)	1,818	(D)	(D)
Manufacturing	31-33	26	1,439	(D)	(D)	1,408	(D)	(D)
Petroleum and coal products	324	3	148	0	148	152	0	152
Chemicals	325	3	(D)	(D)	(D)	(D)	(D)	(D)
Machinery	333	4	(D)	0	(D)	(D)	0	(D)
Computer and electronic products	334	3	(D)	0	(D)	(D)	0	(D)
Electrical equipment, appliances, and components	335	1	(D)	(D)	(D)	(D)	(D)	(D)
Transportation equipment	336	5	983	(D)	(D)	940	(D)	(D)
All other manufacturing	31-33 (minus 324-25, 333-36)	7	(D)	(D)	(D)	(D)	(D)	(D)
Nonmanufacturing	21-23, 42, 44-81	23	391	34	357	410	(S) 34	(S) 376
Mining, extraction, and support activities	21	4	(D)	0	(D)	(D)	0	(D)
All other nonmanufacturing	22-23, 42, 44-81	19	(D)	34	(D)	(D)	(S) 34	(D)

See explanatory information and SOURCE at end of table.

Table A-29. **Total, Federal, company and other funds for industrial energy R&**
companies that performed energy R&D in the U.S., by selected industry and b

Industry	
Distribution by size of company: [Number of employees]	
Total	
5 to 24	
25 to 49	
50 to 99	
100 to 249	
250 to 499	
500 to 999	
1,000 to 4,999	
5,000 to 9,999	
10,000 to 24,999	
25,000 or more	

KEY (D) = Data have been withheld to avoid disclosing operations of individual comp
(S) = Indicates imputation of more than 50 percent.

NOTES Starting with the 1999 survey, estimates are based on the North American Indus
Standard Industrial Classification (SIC) system.

Energy R&D data are collected only on Form RD-1, the questionnaire sent to larg
Consequently, the universe of companies that performs energy R&D may not be
See the technical notes in Section B for more information on Form RD-1 and For

The company R&D in this table is the industrial R&D performed within company fa
predominantly are the company's own, but also include funds from outside organ
nonprofit organizations, and State governments. Excluded from this table are co
contracted out to other organizations) and company-funded R&D not performed i
other foreign organizations).

SOURCE National Science Foundation/Division of Science Resources Statistics, Survey of

D performance in the U.S. and number of y size of company: 1999 and projected 2000

Page 2 of 2

Number of companies	1999			Projected 2000		
	Total	Federal	Company	Total	Federal	Company
	[In millions of dollars]			[In millions of dollars]		
49	1,830	(D)	(D)	1,818	(D)	(D)
0	0	0	0	0	0	0
1	(D)	0	(D)	(D)	0	(D)
0	0	0	0	0	0	0
3	2	(D)	(D)	2	(D)	(D)
2	(D)	0	(D)	(D)	0	(D)
1	(D)	0	(D)	(D)	0	(D)
9	55	(D)	(D)	69	(D)	(D)
9	84	(D)	(D)	96	(D)	(D)
14	210	(D)	(D)	209	(D)	(D)
10	1,452	(D)	(D)	1,415	(D)	(D)

anies.

ry Classification System (NAICS). In prior years, estimates were based on the

er R&D-performing companies.
represented by the statistics in this table.
n RD-1A.

cilities funded from all sources except the Federal Government. The funds
zations such as other companies, research institutions, universities and colleges,
npany-funded R&D not performed within the company (e.g., R&D
the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or

Industrial Research and Development: 1999

Table A-30. **Total, Federal, company and other funds for industrial energy R&D performance in the U.S. and number of companies that performed energy R&D in the U.S., by primary energy source: 1999 and projected 2000**

Primary energy source	Number of companies[1]	1999			Projected 2000		
		Total	Company	Federal	Total	Company	Federal
		[In millions of dollars]			[In millions of dollars]		
Total	49	1,830	959	871	1,818	1,005	813
Fossil fuels	25	722	666	56	735	(S) 679	(S) 55
Nuclear	4	(D)	(D)	(D)	(D)	(D)	(D)
Total geothermal, solar, and conservation and utilization	20	(D)	(D)	(D)	(D)	224	(D)
All other energy	26	768	(D)	(D)	722	(D)	(D)

[1] Detail does not add to total because categories are not mutually exclusive.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.

NOTES: Energy R&D data are collected only on Form RD-1, the questionnaire sent to larger R&D-performing companies. Consequently, the universe of companies that performs energy R&D may not be represented by the statistics in this table. See the technical notes in Section B for more information on Form RD-1 and Form RD-1A.

The company R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-31. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by state in selected years: 1981-99**

Page 1 of 2

State	1981	1983	1985	1987	1989[1]	1991[1,2]	1993[2]	1995[2]	1997[2]	1998[2]	1999[2]
	[In millions of dollars]										
United States, total	51,810	65,268	84,239	92,155	102,055	116,952	117,400	132,103	157,539	169,180	182,823
Alabama	100	187	(S)	1,523	430	596	(S) 557	686	(S) 589	707	556
Alaska	(T)	(T)	(D)	10	9	21	14	30	(S) 24	189	(D)
Arizona	758	(T)	1,079	809	921	1,080	1,039	(S) 1,356	1,854	1,727	4,434
Arkansas	52	(T)	(D)	129	51	(S)	179	181	118	118	216
California	7,626	(T)	(S)	18,636	23,781	(S)	21,975	28,710	34,011	35,568	39,047
Colorado	529	741	988	1,207	1,167	(S)	1,966	1,865	2,248	3,565	(S) 3,136
Connecticut	1,514	1,682	2,129	2,121	2,421	1,756	2,228	3,906	3,014	3,113	3,984
Delaware	(T)	(T)	(D)	(D)	(D)	(D)	(S) 913	(S) 1,077	(S) 1,009	2,476	(S) 1,261
District of Columbia	(T)	(T)	(D)	(D)	(D)	46	(S) 515	(S) 672	(D)	(S) 503	171
Florida	1,449	(T)	1,973	2,041	2,352	(S)	2,386	4,101	3,442	3,300	(S) 2,697
Georgia	220	348	(D)	958	722	993	792	1,175	1,273	1,444	1,827
Hawaii	(T)	(T)	13	70	9	13	255	14	87	(S) 17	27
Idaho	(T)	(T)	451	467	(D)	(S)	686	827	(S) 1,181	(S) 1,028	1,210
Illinois	2,077	2,291	(D)	4,099	4,068	5,750	5,023	(S) 5,776	6,248	6,892	7,715
Indiana	1,054	(T)	(D)	1,860	1,823	2,274	2,141	(S) 2,721	2,677	(S) 2,622	(S) 2,246
Iowa	393	287	(D)	328	365	527	505	998	578	634	559
Kansas	211	293	(D)	1,128	406	(S)	(S) 280	569	(S) 1,136	(S) 1,279	(S) 1,284
Kentucky	170	191	(D)	238	227	176	282	452	359	427	684
Louisiana	158	257	(D)	128	169	(S)	106	61	172	102	187
Maine	(T)	(T)	(D)	39	33	(S)	(D)	286	83	82	140
Maryland	(T)	(T)	1,548	1,292	1,093	1,376	1,296	1,075	1,425	1,744	1,700
Massachusetts	1,907	2,466	4,495	5,255	5,851	(S)	5,960	7,416	8,300	10,604	9,314
Michigan	4,272	5,716	6,436	7,095	8,506	9,283	18,845	12,388	13,009	12,648	17,714
Minnesota	1,180	1,814	(D)	2,145	2,075	2,070	2,341	(S) 2,636	3,116	3,321	3,379
Mississippi	(T)	(T)	62	42	56	(S)	51	66	73	73	114
Missouri	1,137	(T)	(D)	1,823	2,391	(S)	(S) 1,339	(S) 2,028	(S) 1,290	(S) 1,313	(S) 1,387
Montana	(T)	(T)	(D)	7	(D)	(S)	(D)	17	92	82	33
Nebraska	28	26	(D)	59	64	67	93	150	71	93	178
Nevada	(T)	(T)	(S)	55	29	95	65	322	380	434	337
New Hampshire	(T)	(T)	(D)	90	(D)	(D)	247	472	652	1,187	1,099

See explanatory information and SOURCE at end of table.

Table A-31. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by state in selected years: 1981-99**

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State	1981	1983	1985	1987	1989[1]	1991[1,2]	1993[2]	1995[2]	1997[2]	1998[2]	1999[2]
	[In millions of dollars]										
New Jersey	3,355	4,364	5,975	5,876	6,410	8,933	8,009	8,200	11,069	10,415	9,453
New Mexico	(T)	(T)	(D)	950	1,039	1,217	(D)	1,461	(S) 1,310	(S) 1,205	(S) 1,342
New York	4,057	5,951	7,561	6,276	8,107	9,457	8,597	8,651	(S) 9,939	11,176	11,388
North Carolina	546	786	(D)	1,666	1,311	1,470	1,886	2,226	3,590	3,362	3,953
North Dakota	(T)	(T)	10	57	(S)	(S)	(D)	12	33	34	75
Ohio	1,781	2,282	3,067	3,415	3,964	5,406	4,494	4,001	5,608	5,338	6,514
Oklahoma	339	407	(D)	367	333	448	299	288	428	245	365
Oregon	(T)	(T)	(D)	281	357	(S)	455	741	1,102	1,492	1,540
Pennsylvania	3,003	3,963	3,844	4,430	4,653	(S)	4,652	5,331	(S) 6,609	7,083	8,932
Rhode Island	87	171	213	224	140	174	154	520	(S) 704	(S) 1,320	(S) 1,264
South Carolina	(T)	(T)	(D)	500	388	479	461	739	(S) 783	695	665
South Dakota	(T)	(T)	(S)	4	4	6	(D)	19	26	5	13
Tennessee	(T)	(T)	(D)	621	934	843	788	1,003	1,089	2,040	1,768
Texas	(T)	(T)	3,762	4,077	5,051	5,439	4,562	(S) 6,211	7,265	8,408	9,935
Utah	265	242	(D)	774	389	407	279	803	1,027	1,109	1,123
Vermont	(T)	(T)	(D)	236	(D)	(D)	(D)	248	246	112	318
Virginia	539	941	862	1,284	1,131	1,275	1,046	1,577	1,767	2,707	2,488
Washington	(T)	(T)	2,351	2,939	2,728	3,677	(S) 4,575	(S) 4,294	(S) 6,610	(S) 7,476	(S) 7,231
West Virginia	(T)	(T)	(D)	83	(D)	(D)	(S) 100	243	(D)	(S) 225	(S) 216
Wisconsin	558	(T)	728	1,165	1,035	1,304	1,296	1,706	1,707	1,919	1,949
Wyoming	(T)	2	3	4	(D)	2	15	25	28	(S) 2	(D)
Undistributed funds	(T)	3,931	1,495	2,281	2,945	772	683	(S) 1,773	(S) 7,211	(S) 5,520	(S) 5,649

[1] As a result of a new sample design, statistics for 1989-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. See the technical notes for more information.

[2] As a result of the new sample design, statistics for 1991 and later years are not directly comparable with statistics for 1990 and earlier years.

KEY
(D) = Data have been withheld to avoid disclosing information about individual companies.
(S) = Indicates imputation of more than 50 percent. For years prior to 1993, data have been withheld.
(T) = Data are not separately available but included in total.

SOURCE National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-32. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by state and source of funds: 1999**

Page 1 of 2

State	Number of companies[1]	Total	Federal	Company
		[In millions of dollars]		
United States, total	39,005	182,823	22,535	160,288
Alabama	636	556	190	365
Alaska	9	(D)	(D)	3
Arizona	780	4,434	(S) 224	4,210
Arkansas	97	216	3	213
California	6,903	39,047	4,042	35,006
Colorado	1,157	3,136	(D)	(D)
Connecticut	755	(S) 3,984	207	3,777
Delaware	53	(S) 1,261	9	1,252
District of Columbia	39	171	52	119
Florida	1,143	(S) 2,697	706	1,991
Georgia	761	1,827	178	1,649
Hawaii	81	27	1	26
Idaho	209	1,210	(D)	(D)
Illinois	2,273	7,715	(S) 41	7,674
Indiana	818	(S) 2,246	(D)	(D)
Iowa	249	559	(S) 6	553
Kansas	525	(S) 1,284	(D)	(D)
Kentucky	599	684	1	683
Louisiana	104	187	53	134
Maine	15	140	52	88
Maryland	974	1,700	455	1,246
Massachusetts	1,401	9,314	(S) 2,374	6,940
Michigan	1,855	17,714	134	17,580
Minnesota	740	3,379	(S) 242	3,137
Mississippi	289	114	43	71
Missouri	498	(S) 1,387	21	1,367
Montana	6	33	(D)	(D)
Nebraska	258	178	6	172
Nevada	30	337	(D)	(D)
New Hampshire	301	1,099	(D)	(D)
New Jersey	1,467	9,453	126	9,327
New Mexico	419	(S) 1,342	(D)	(D)
New York	1,861	11,388	(S) 2,105	9,284
North Carolina	391	3,953	19	3,934
North Dakota	21	75	0	75
Ohio	2,255	6,514	1,148	5,366
Oklahoma	231	365	2	363
Oregon	1,453	1,540	(S) 3	1,537
Pennsylvania	2,261	8,932	(S) 441	8,491
Rhode Island	193	(S) 1,264	(D)	(D)

See explanatory information and SOURCE at the end of table.

Table A-32. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of companies that performed R&D in the U.S., by state and source of funds: 1999**

Page 2 of 2

State	Number of companies[1]	Total	Federal	Company
		[In millions of dollars]		
South Carolina	109	665	(D)	(D)
South Dakota	13	13	0	13
Tennessee	436	1,768	(D)	(D)
Texas	2,494	9,935	118	9,817
Utah	587	1,123	(D)	(D)
Vermont	124	318	(D)	(D)
Virginia	1,382	2,488	1,096	1,391
Washington	1,367	(S) 7,231	(D)	(D)
West Virginia	91	(S) 216	(D)	(D)
Wisconsin	1,022	1,949	72	1,877
Wyoming	1	(D)	0	(D)
Undistributed funds[2]	210	(S) 5,649	(S) 1,077	4,572

[1] Detail does not add to total because categories are not mutually exclusive.

[2] Includes data reported on Form RD-1 that were not allocated to a specific state.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.

NOTE: The company R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-33. **Total (Federal plus company and other) funds for industrial R&D performanc companies in the U.S., by industry and by size of company, for the U.S. and top 10 R&D-**

Industry and size of company	NAICS codes	Number of companies	U.S., total	California
Distribution by industry:				
All industries	21-23, 31-33, 42, 44-81	39,005	182,823	39,047
Manufacturing	31-33	18,059	116,921	21,781
Food	311	526	1,132	(S) 23
Beverage and tobacco products	312	6	(D)	(D)
Textiles, apparel, and leather	313-16	441	334	11
Wood products	321	145	70	(S) 19
Paper, printing and support activities	322, 323	195	(D)	(D)
Petroleum and coal products	324	61	615	(D)
Chemicals	325	847	20,246	1,031
Basic chemicals	3251	137	2,746	(S) 24
Resin, synthetic rubber, fibers, and filament	3252	14	(D)	0
Pharmaceuticals and medicines	3254	175	(D)	968
Other chemicals	325 (minus 3251-52, 3254)	522	(D)	38
Plastics and rubber products	326	679	1,785	316
Nonmetallic mineral products	327	237	(D)	11
Primary metals	331	208	470	(D)
Fabricated metal products	332	1,202	1,655	(S) 305
Machinery	333	1,466	6,057	1,270
Computer and electronic products	334	1,157	35,932	(S) 13,576
Computers and peripheral equipment	3341	120	(D)	(S) 1,368
Communications equipment	3342	163	6,003	775
Semiconductor and other electronic components	3344	441	10,701	(S) 6,517
Navigational, measuring, electromedical, and control instruments	3345	280	14,337	4,737
Other computer and electronic products	334 (minus 3341-42, 3344-45)	154	(D)	179
Electrical equipment, appliances, and components	335	384	(D)	367
Transportation equipment	336	450	33,965	(S) 3,555

See explanatory information and SOURCE at end of table.

e in the U.S. and number of R&D-performing
performing states: 1999

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ichigan	New York	Texas	New Jersey	Massa-chusetts	Pennsyl-vania	Illinois	Washing-ton	Ohio	All other states plus undistributed
			[In millions of dollars]						
17,714	11,388	9,935	9,453	9,314	8,932	7,715	(S) 7,231	6,514	55,580
16,290	(S) 8,051	(S) 3,963	(S) 6,684	(S) 5,569	5,992	(S) 5,292	(S) 3,508	3,576	36,213
(D)	(D)	8	(S) 142	(D)	54	114	(D)	4	583
(D)	0	0	0	0	0	(D)	0	0	(D)
(D)	13	6	1	28	7	2	5	(D)	255
(D)	0	1	0	0	(D)	2	2	2	43
(D)	(S) 107	(D)	(D)	17	32	31	(D)	(D)	1,217
(D)	0	259	(D)	(D)	34	(D)	0	(D)	122
1,140	1,757	(D)	4,097	653	(S) 2,441	(S) 1,472	(D)	345	6,476
(D)	57	(S) 381	(D)	(D)	(D)	95	(D)	(S) 76	(D)
(D)	(D)	(S) 45	(D)	(D)	(D)	(D)	0	(D)	(D)
(D)	623	(D)	2,961	361	(S) 1,711	(D)	(D)	(D)	3,295
(D)	(D)	(S) 46	296	164	136	116	(D)	136	975
55	(S) 77	(S) 35	58	24	(S) 112	28	25	(S) 452	602
59	(D)	12	(D)	0	(D)	(D)	0	(S) 94	86
40	20	(S) 20	(S) 3	(S) 12	(S) 152	13	6	54	(D)
46	38	9	(D)	90	(S) 143	94	(D)	125	721
396	294	219	97	148	182	(S) 658	(S) 14	213	2,568
(S) 320	354	(S) 2,428	(S) 1,723	(S) 3,841	(S) 761	(S) 1,623	(S) 406	190	10,709
3	114	(D)	(D)	282	(D)	(D)	(D)	(D)	734
38	(S) 43	(D)	(D)	(D)	(D)	(D)	(D)	(D)	2,069
(S) 106	116	(S)1,377	51	(S) 612	85	242	115	11	1,470
(S) 173	(S) 82	88	119	(S) 2,570	92	(S) 127	(S) 261	148	5,942
0	0	0	0	(D)	0	(D)	0	0	496
58	483	(S) 73	(D)	377	137	293	23	627	1,408
13,730	(S) 3,225	130	112	(S) 63	(S) 351	326	(D)	(D)	9,376

Table A-33. **Total (Federal plus company and other) funds for industrial R&D performanc companies in the U.S., by industry and by size of company, for the U.S. and top 10 R&D-**

Industry and size of company	NAICS codes	Number of companies	U.S., total	California
Distribution by industry:				
Motor vehicles, trailers, and parts	3361-63	306	(D)	(D)
Aerospace products and parts	3364	24	14,425	1,120
Other transportation equipment	336 (minus 3361-64)	120	(D)	(D)
Furniture and related products	337	205	248	(D)
Miscellaneous manufacturing	339	549	3,851	391
Medical equipment and supplies	3391	264	(D)	297
Other miscellaneous manufacturing	339 (minus 3391)	284	(D)	94
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--
Small manufacturing companies [1]	Fewer than 50 employees	9,300	3,019	713
Nonmanufacturing	21-23, 42, 44-81	20,946	65,902	17,266
Mining, extraction, and support activities	21	217	(D)	(D)
Utilities	22	58	142	(D)
Construction	23	558	691	(D)
Trade	42, 44, 45	2,671	19,616	5,985
Transportation and warehousing	48, 49	127	460	(D)
Information	51	1,690	15,389	4,520
Publishing	511	1,302	11,302	3,693
Newspaper, periodical, book, and database	5111	155	371	94
Software	5112	1,147	10,931	3,600
Broadcasting and telecommunications	513	84	(D)	138
Radio and television broadcasting	5131	51	(D)	(D)
Telecommunications	5133	15	(D)	58
Other broadcasting and telecommunications	513 (minus 5131, 5133)	18	31	(D)
Other information	51(minus 511, 513)	303	(D)	689
Finance, insurance, and real estate	52, 53	258	(D)	54
Professional, scientific, and technical services	54	3,968	18,994	6,389

See explanatory information and SOURCE at end of table.

in the U.S. and number of R&D-performing
performing states: 1999

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chigan	New York	Texas	New Jersey	Massa-chusetts	Pennsyl-vania	Illinois	Washing-ton	Ohio	All other states plus undistributed
[In millions of dollars]									
13,517	(D)	25	(D)	(D)	(D)	219	138	152	1,862
(D)	(D)	(D)	(D)	(S) 25	(D)	(S) 74	(D)	(S) 305	6,705
(D)	47	(D)	(D)	(D)	(D)	34	(D)	(D)	809
68	(D)	4	0	0	0	2	(D)	11	157
(D)	(D)	48	99	265	105	(S) 322	28	63	1,133
(D)	(D)	47	92	(D)	95	(D)	(D)	52	858
(D)	1	1	7	(D)	10	(D)	(D)	10	276
--	--	--	--	--	--	--	--	--	--
22	137	44	56	46	1,459	67	60	18	395
1,423	3,338	5,973	2,769	3,745	2,940	2,423	(S) 3,723	2,938	19,366
0	(D)	2,015	0	0	0	(D)	0	(D)	214
(D)	26	(D)	5	(D)	3	(D)	0	(D)	71
0	(D)	(D)	(D)	0	(D)	415	(D)	(D)	80
(D)	1,548	1,555	1,605	1,063	872	(D)	126	294	4,729
0	0	(D)	0	0	(D)	6	0	(D)	437
(D)	(S) 820	973	(S) 588	750	483	(D)	(D)	158	3,630
93	(S) 733	(D)	(D)	531	139	72	(D)	(S) 89	2,620
49	(D)	(D)	(D)	(D)	(S) 11	0	0	0	47
44	(D)	368	97	(D)	127	72	(D)	(S) 89	2,573
0	62	398	(D)	(D)	(D)	4	7	0	374
0	0	0	0	0	(D)	0	0	0	(D)
0	(D)	398	(D)	(D)	(D)	0	0	0	293
0	(D)	0	0	0	0	4	7	0	(D)
(D)	25	(D)	16	(D)	(D)	(D)	88	69	635
0	275	167	(D)	(D)	38	83	0	(D)	622
478	570	497	442	1,717	354	184	430	2,203	5,731

Table A-33. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S. and number of R&D-performing companies in the U.S., by industry and by size of company, for the U.S. and top 10 R&D-performing states: 1999**

Industry and size of company	NAICS codes	Number of companies	U.S., total	California	Michigan	New York	Texas	New Jersey	Massa-chusetts	Pennsyl-vania	Illinois	Washing-ton	Ohio	All other states plus undistributed
				[In millions of dollars]										
Distribution by industry:														
Architectural, engineering, and related services	5413	1,045	3,580	665	176	(D)	(S) 86	37	(D)	5	(D)	17	823	1,438
Computer systems design and related services	5415	1,653	(D)	1,182	(S) 137	89	146	106	301	206	69	73	(D)	1,992
Scientific R&D services	5417	913	10,470	4,522	164	306	248	284	1,324	135	23	326	1,321	1,816
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	356	(D)	20	0	(D)	17	14	(D)	8	(D)	13	(D)	486
Management of companies and enterprises	55	28	(D)	0	(D)	14	1	(D)	52	(D)	(D)	0	0	0
Health care services	621-23	405	642	49	0	14	0	(D)	0	(D)	0	30	0	10
Other nonmanufacturing	56, 61, 624, 71, 72, 81	966	(D)	141	1	24	(D)	(D)	1	23	229	0	(D)	264
Small nonmanufacturing companies [1]	Fewer than 15 employees	10,002	5,203	35	12	25	575	37	17	621	49	204	48	3,579
Distribution by size of company: [Number of employees]														
Total		39,005	182,823	39,047	17,714	11,388	9,935	9,453	9,314	8,932	7,715	(S) 7,231	6,514	55,580
5 to 24		18,355	7,004	628	132	242	178	114	122	743	81	361	90	4,313
25 to 49		6,749	4,750	1,563	92	290	45	81	372	110	49	65	871	1,211
50 to 99		5,102	7,225	1,978	90	318	684	113	291	1,560	515	161	101	1,413
100 to 249		4,083	7,213	2,570	184	208	165	326	639	219	270	211	154	2,269
250 to 499		1,788	7,892	2,399	198	182	2,121	166	365	182	113	299	155	1,711
500 to 999		1,118	7,032	1,649	(S) 247	243	370	(S) 196	835	267	235	65	400	2,526
1,000 to 4,999		1,157	24,840	8,176	2,373	605	558	990	1,466	1,100	(S) 819	240	487	8,025
5,000 to 9,999		288	16,376	3,821	415	(S) 857	786	1,395	985	455	408	52	1,222	5,980
10,000 to 24,999		198	24,922	(S) 2,421	1,639	943	(S) 2,032	(S) 2,684	(D)	(S) 1,781	(S) 763	(D)	(S) 829	8,277
25,000 or more		167	75,569	(S) 13,842	12,342	(S) 7,500	2,997	(S) 3,388	(D)	(S) 2,516	(S) 4,462	(D)	2,204	19,856

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTE: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-34. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and by size of company, by type of cost: 1999**

Industry and size of company	NAICS codes	Total R&D costs	Wages of R&D personnel	Materials and supplies	R&D depreciation	Other costs
		[In millions of dollars]	[Percent]			
Distribution by industry:						
All industries	21-23, 31-33, 42, 44-81	182,823	(S) 44.8	(S) 14.2	1.9	(S) 39.1
Manufacturing	31-33	116,921	(S) 40.0	(S) 15.5	1.8	(S) 42.7
Food	311	1,132	(S) 42.6	(S) 12.3	1.3	(S) 43.9
Beverage and tobacco products	312	(D)	50.4	11.4	3.5	34.7
Textiles, apparel, and leather	313-16	334	(S) 32.7	(S) 14.4	0.8	(S) 52.2
Wood products	321	70	73.8	12.9	(D)	(D)
Paper, printing and support activities	322, 323	(D)	(S) 50.1	(S) 10.8	2.2	37.0
Petroleum and coal products	324	615	50.7	7.1	(D)	(D)
Chemicals	325	20,246	(S) 45.8	(S) 10.0	4.0	(S) 40.3
Basic chemicals	3251	2,746	(S) 63.8	9.5	4.1	22.6
Resin, synthetic rubber, fibers, and filament	3252	(D)	51.3	10.5	10.1	28.1
Pharmaceuticals and medicines	3254	(D)	(S) 39.4	(S) 10.2	3.4	(S) 47.0
Other chemicals	325 (minus 3251-52, 3254)	(D)	(S) 53.1	(S) 9.2	1.1	(S) 36.6
Plastics and rubber products	326	1,785	(S) 41.9	(S) 30.5	1.1	(S) 26.5
Nonmetallic mineral products	327	(D)	28.2	25.4	5.3	41.0
Primary metals	331	470	73.4	7.2	1.0	(S) 18.3
Fabricated metal products	332	1,655	(S) 50.3	(S) 19.2	0.9	(S) 29.5
Machinery	333	6,057	45.2	22.1	2.6	30.2
Computer and electronic products	334	35,932	(S) 34.9	(S) 10.5	1.7	(S) 52.8
Computers and peripheral equipment	3341	(D)	52.0	(S) 21.4	3.8	22.8
Communications equipment	3342	6,003	(S) 52.9	(S) 14.6	1.3	(S) 31.2
Semiconductor and other electronic components	3344	10,701	(S) 49.0	(S) 12.0	3.3	(S) 35.7
Navigational, measuring, electromedical, and control instruments	3345	14,337	(S) 12.6	(S) 4.6	0.3	(S) 82.5
Other computer and electronic products	334 (minus 3341-42, 3344-45)	(D)	40.3	(S) 15.0	0.6	44.0
Electrical equipment, appliances, and components	335	(D)	48.3	15.4	2.2	34.1
Transportation equipment	336	33,965	36.5	(S) 23.9	0.6	(S) 39.0
Motor vehicles, trailers, and parts	3361-63	(D)	40.1	(S) 29.6	0.7	(S) 29.6
Aerospace products and parts	3364	14,425	33.3	19.0	0.4	(S) 47.3
Other transportation equipment	336 (minus 3361-64)	(D)	32.0	14.4	(S) 1.6	(S) 52.1
Furniture and related products	337	248	59.0	14.2	(D)	(D)
Miscellaneous manufacturing	339	3,851	(S) 52.3	(S) 12.3	0.7	(S) 34.7
Medical equipment and supplies	3391	(D)	(S) 52.9	(S) 11.7	0.6	(S) 34.9
Other miscellaneous manufacturing	339 (minus 3391)	(D)	48.0	16.7	1.9	33.4
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	–	–	–	–	–
Small manufacturing companies [1]	Fewer than 50 employees	3,019	(D)	(D)	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-34. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and by size of company, by type of cost: 1999**

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Industry and size of company	NAICS codes	Total R&D costs	Wages of R&D personnel	Materials and supplies	R&D depreciation	Other costs
		[In millions of dollars]	[Percent]			
Distribution by industry:						
Nonmanufacturing	21-23, 42, 44-81	65,902	57.2	11.1	2.0	29.8
Mining, extraction, and support activities	21	(D)	54.7	19.5	(S) 0.6	25.2
Utilities	22	142	28.7	25.5	(D)	(D)
Construction	23	691	(D)	10.1	(D)	(D)
Trade	42, 44, 45	19,616	58.8	15.4	2.6	23.2
Transportation and warehousing	48, 49	460	(D)	(D)	0.0	(D)
Information	51	15,389	(S) 62.9	3.4	1.2	(S) 32.5
Publishing	511	11,302	(S) 59.8	2.9	1.2	(S) 36.2
Newspaper, periodical, book, and database	5111	371	(S) 61.5	8.4	(D)	(D)
Software	5112	10,931	(S) 59.8	2.7	1.2	(S) 36.4
Broadcasting and telecommunications	513	(D)	(S) 69.1	(S) 8.5	2.3	(S) 20.2
Radio and television broadcasting	5131	(D)	100.0	0.0	0.0	0.0
Telecommunications	5133	(D)	(S) 69.1	(S) 8.5	2.2	(S) 20.2
Other broadcasting and telecommunications	513 (minus 5131, 5133)	31	100.0	0.0	0.0	0.0
Other information	51 (minus 511, 513)	(D)	75.3	2.7	0.3	21.7
Finance, insurance, and real estate	52, 53	(D)	(S) 73.7	3.5	0.0	22.8
Professional, scientific, and technical services	54	18,994	44.6	13.8	2.5	39.1
Architectural, engineering, and related services	5413	3,580	(S) 48.8	(S) 15.9	(D)	(D)
Computer systems design and related services	5415	(D)	70.9	4.4	0.9	23.7
Scientific R&D services	5417	10,470	36.2	15.6	3.6	44.6
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	(D)	63.5	(S) 10.5	(D)	25.3
Management of companies and enterprises	55	(D)	100.0	0.0	0.0	0.0
Health care services	621-23	642	(D)	(D)	(D)	(D)
Other nonmanufacturing	56, 61, 624, 71, 72, 81	(D)	66.3	(S) 7.0	0.0	26.7
Small nonmanufacturing companies [1]	Fewer than 15 employees	5,203	(D)	(D)	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-34. **Total (Federal plus company and other) funds for industrial R&D performance in the U.S., by industry and by size of company, by type of cost: 1999**

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Industry and size of company		Total R&D costs	Wages of R&D personnel	Materials and supplies	R&D depreciation	Other costs
		[In millions of dollars]	[Percent]			
Distribution by size of company: [Number of employees]						
Total		182,823	(S) 44.8	(S) 14.2	1.9	(S) 39.1
5 to 24		7,004	(S) 50.0	(D)	(D)	37.5
25 to 49		4,750	(S) 40.0	(S) 13.3	3.3	43.3
50 to 99		7,225	40.3	15.1	2.5	42.0
100 to 249		7,213	47.1	12.5	3.3	37.1
250 to 499		7,892	47.1	13.1	3.2	36.6
500 to 999		7,032	48.5	12.2	2.8	36.4
1,000 to 4,999		24,840	49.7	10.9	3.4	36.0
5,000 to 9,999		16,376	50.3	14.5	2.0	(S) 33.2
10,000 to 24,999		24,922	(S) 48.0	(S) 12.2	2.2	(S) 37.6
25,000 or more		75,569	(S) 41.1	(S) 15.9	1.2	(S) 41.8

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[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTE: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-35. **Domestic employment of companies that performed industrial R&D in the U.S., by industry, by size of company: 1999**

Page 1 of 3

Industry	NAICS codes	Total	Size of company [number of employees]									
			5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
		[In thousands]										
Distribution by industry:												
All industries	21-23, 31-33, 42, 44-81	22,935	206	242	353	607	665	779	2,678	2,078	3,103	12,224
Manufacturing	31-33	10,930	75	138	188	424	339	634	1,941	1,410	1,989	3,793
Food	311	1,028	0	0	7	21	25	45	191	101	243	394
Beverage and tobacco products	312	77	0	0	0	0	0	0	9	(D)	0	(D)
Textiles, apparel, and leather	313-16	359	(D)	2	10	18	15	27	103	32	122	(D)
Wood products	321	71	(D)	0	5	6	1	2	31	(D)	(D)	0
Paper, printing and support activities	322, 323	683	0	0	0	15	3	25	77	50	154	360
Petroleum and coal products	324	116	0	0	4	0	1	(D)	(D)	(D)	71	(D)
Chemicals	325	989	0	3	13	56	23	26	197	141	275	254
Basic chemicals	3251	255	0	0	3	5	(D)	7	58	32	96	(D)
Resin, synthetic rubber, fibers, and filament	3252	124	0	0	0	0	(D)	0	23	21	(D)	(D)
Pharmaceuticals and medicines	3254	310	0	0	(D)	24	1	(S) 3	50	26	(D)	94
Other chemicals	325 (minus 3251-52, 3254)	300	0	2	(D)	27	17	16	65	62	55	(D)
Plastics and rubber products	326	550	0	0	8	36	55	54	129	105	53	110
Nonmetallic mineral products	327	218	0	0	6	(D)	19	(D)	(D)	44	47	0
Primary metals	331	368	0	0	4	(D)	10	38	73	75	76	(D)
Fabricated metal products	332	728	0	5	15	76	45	68	105	129	116	168
Machinery	333	865	1	5	39	56	38	93	162	210	168	94
Computer and electronic products	334	1,283	(D)	4	18	51	56	107	275	166	(D)	387
Computers and peripheral equipment	3341	167	(D)	0	1	6	10	6	18	55	44	(D)
Communications equipment	3342	198	0	0	0	12	13	22	36	21	(D)	(D)
Semiconductor and other electronic components	3344	373	(D)	0	13	19	15	30	130	54	60	(D)
Navigational, measuring, electromedical, and control instruments	3345	502	0	0	3	10	16	31	75	36	97	233
Other computer and electronic products	334 (minus 3341-42, 3344-45)	43	0	4	0	3	1	18	16	0	0	0
Electrical equipment, appliances, and components	335	645	0	0	7	15	(D)	47	89	61	161	(D)
Transportation equipment	336	2,139	0	2	1	20	5	64	213	171	162	1,500
Motor vehicles, trailers, and parts	3361-63	1,177	0	2	0	12	(D)	47	179	98	77	(D)
Aerospace products and parts	3364	766	0	0	(D)	(D)	0	(D)	14	55	(D)	672
Other transportation equipment	336 (minus 3361-64)	196	0	0	(D)	(D)	(D)	(D)	20	17	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-35. **Domestic employment of companies that performed industrial R&D in the**

Industry	NAICS codes	Total
Distribution by industry:		
Furniture and related products	337	243
Miscellaneous manufacturing	339	333
Medical equipment and supplies	3391	196
Other miscellaneous manufacturing	339 (minus 3391)	137
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--
Small manufacturing companies [1]	Fewer than 50 employees	237
Nonmanufacturing	21-23, 42, 44-81	12,004
Mining, extraction, and support activities	21	358
Utilities	22	410
Construction	23	154
Trade	42, 44, 45	1,312
Transportation and warehousing	48, 49	753
Information	51	1,664
Publishing	511	346
Newspaper, periodical, book, and database	5111	124
Software	5112	222
Broadcasting and telecommunications	513	1,153
Radio and television broadcasting	5131	(D)
Telecommunications	5133	1,100
Other broadcasting and telecommunications	513 (minus 5131, 5133)	(D)
Other information	51 (minus 511, 513)	165
Finance, insurance, and real estate	52, 53	833
Professional, scientific, and technical services	54	712

See explanatory information and SOURCE at end of table.

e U.S., by industry, by size of company: 1999

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	Size of company [number of employees]									
	5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
	[In thousands]									
43	0	0	4	11	4	7	75	51	90	0
33	0	0	15	26	20	28	112	46	(D)	(D)
96	0	0	6	13	8	10	56	46	(D)	(D)
37	0	0	8	13	12	18	56	0	(D)	(D)
--	--	--	--	--	--	--	--	--	--	--
37	74	117	32	12	(D)	(D)	0	0	0	0
04	130	104	165	183	327	145	736	668	1,114	8,431
58	0	(D)	(D)	0	23	32	196	25	78	0
10	0	0	0	0	0	(D)	57	167	158	(D)
54	0	3	15	12	42	(D)	(D)	18	0	(D)
12	13	25	29	40	43	36	200	113	104	709
53	1	(D)	0	(D)	0	(D)	6	50	146	547
64	8	15	19	49	28	31	74	56	111	1,273
46	6	13	14	41	18	(D)	52	37	71	(D)
24	0	0	4	19	0	(D)	(D)	0	(D)	(D)
22	6	13	11	21	18	26	(D)	37	(D)	0
53	0	2	1	2	0	(D)	(D)	0	(D)	1,128
D)	0	2	0	0	0	0	(D)	0	0	(D)
00	0	0	0	(D)	0	(D)	(D)	0	(D)	1,083
D)	0	0	1	(D)	0	(D)	0	0	0	(D)
65	2	0	4	7	10	3	(D)	19	(D)	(D)
33	2	1	0	(D)	(D)	4	43	43	182	540
12	19	43	59	68	47	37	115	115	83	126

Table A-35. **Domestic employment of companies that performed industrial R&D in the**

Industry	NAICS codes	Total
Distribution by industry:		
Architectural, engineering, and related services	5413	17
Computer systems design and related services	5415	22
Scientific R&D services	5417	13
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	17
Management of companies and enterprises	55	
Health care services	621-23	4
Other nonmanufacturing	56, 61, 624, 71, 72, 81	5,54
Small nonmanufacturing companies [1]	Fewer than 15 employees	21

[1] The frame from which the statistical sample was selected was divided into two partitions based on
were included in the large company partition. In the nonmanufacturing sector, companies with emp
with employment below these values, but with at least 5 employees, were included in the small con
estimates largely attributed to the random year-to-year selection of small companies by industry an
industry statistics were possible only from the large company partition; detailed industry statistics f
separately and are included in manufacturing, nonmanufacturing, and all industries totals. Note tha
preliminary information available from the sampling frame and the number of employees may have
above the 50 employees threshold for manufacturing companies and the 15 employee threshold fo
"sample selection" in Section B.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTE: Starting with the 1999 survey, estimates are based on the North American Industry Class
Standard Industrial Classification (SIC) system.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industri

e U.S., by industry, by size of company: 1999

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	Size of company [number of employees]									
l	5 to 24	25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In thousands]										
178	6	13	11	10	(D)	(D)	30	(D)	58	0
227	9	17	24	28	22	18	42	35	(D)	(D)
138	4	10	14	21	13	10	16	(D)	(D)	(D)
170	1	3	9	9	(D)	(D)	27	36	(D)	(D)
7	0	0	(D)	(D)	(D)	0	6	0	0	0
46	3	8	0	0	1	0	(D)	0	(D)	0
542	2	6	24	12	10	2	36	80	217	5,151
215	82	0	(D)	(D)	117	0	0	0	0	0

n total company employment. In the manufacturing sector, companies with employment of 50 or more
nployment of 15 or more were included in the large company partition. Companies in the respective sectors
ompany partition. The purpose of partitioning the sample this way was to reduce the variability in industry
and the high sampling weights that sometimes were assigned to them. Because of this, detailed
from the small company partition were not possible. Statistics from the small company partition are shown
at because companies were assigned to the "small company" partition of the sample based on
e been revised during statistical processing, some companies' statistics are reported in size categories
for nonmanufacturing companies. For more detailed information, please see "frame creation" and

ssification System (NAICS). In prior years, estimates were based on the

trial Research and Development: 1999

Table A-36. **R&D funds per employee spent by companies that performed industrial R&D in the U.S., by size of company: 1997-99**

Size of company [Number of employees]	1997	1998	1999
	Total (company, Federal, and other) R&D funds per employee [In dollars]		
Total	7,791	9,251	7,972
5 to 24	19,764	20,630	34,057
25 to 49	12,985	12,788	19,590
50 to 99	13,948	17,080	20,460
100 to 499	10,561	13,897	11,892
250 to 499	10,803	10,110	11,861
500 to 999	6,287	6,872	9,031
1,000 to 4,999	6,849	7,755	9,276
5,000 to 9,999	6,331	6,832	7,881
10,000 to 24,999	6,747	8,494	8,031
25,000 or more	7,990	9,671	6,182
	Company and other (except Federal) R&D funds per employee [In dollars]		
Total	6,608	7,929	6,989
5 to 24	16,961	17,967	31,087
25 to 49	11,772	10,994	18,072
50 to 99	12,533	15,534	18,754
100 to 499	9,710	11,998	10,781
250 to 499	10,021	9,271	11,132
500 to 999	5,810	6,418	8,272
1,000 to 4,999	6,660	7,531	8,942
5,000 to 9,999	6,059	6,572	6,825
10,000 to 24,999	6,461	8,168	7,903
25,000 or more	5,884	7,254	4,896

NOTE: Averages were derived by dividing total and company R&D funds spent during a calendar year by total employment in March of that year.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-37. **Distribution of total employment in companies that performed industrial R&D in the U.S., ranked by size of R&D program: 1989-99**

Companies ranked by size of R&D program	1989 [1]	1990 [1]	1991 [1]	1992	1993	1994	1995	1996	1997	1998	1999
	[Percent]										
Total	100	100	100	100	100	100	100	100	100	100	100
First 4 (1-4)	7	7	7	7	6	6	6	6	5	5	3
Next 4 (5-8)	3	3	3	3	2	2	2	2	3	3	2
Next 12 (9-20)	6	5	5	5	5	4	4	4	3	4	4
Next 20 (21-40)	4	5	4	4	4	4	4	4	4	4	3
Next 60 (41-100)	10	9	9	8	8	7	7	7	5	7	5
Next 100 (101-200)	8	8	10	9	9	8	7	8	9	8	6
Next 200 (201-400)	9	11	10	10	10	9	9	9	17	11	11
All others	53	52	52	47	55	59	61	59	34	60	66

[1] As a result of a new sample design, statistics for 1989-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. See the technical notes for more information.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-38. **Number of full-time equivalent (FTE) R&D scientists and engineers in companies that performed industrial R&D in the U.S., by industry and by size of company, by source of R&D funds: January 2000**

Page 1 of 3

Industry and size of company	NAICS codes	Total	Federal	Company
			[In thousands]	
Distribution by industry:				
All industries	21-23, 31-33, 42, 44-81	1,033.7	(S) 99.1	934.6
Manufacturing	31-33	596.7	(S) 69.4	(S) 527.3
Food	311	7.7	0.0	7.7
Beverage and tobacco products	312	1.9	(D)	(D)
Textiles, apparel, and leather	313-16	11.1	(D)	(D)
Wood products	321	0.7	0.0	0.7
Paper, printing and support activities	322, 323	(S) 13.4	(D)	(D)
Petroleum and coal products	324	3.0	(D)	(D)
Chemicals	325	82.7	(S) 0.7	(S) 82.0
Basic chemicals	3251	15.2	(S) 0.2	(S) 15.0
Resin, synthetic rubber, fibers, and filament	3252	8.0	(D)	(D)
Pharmaceuticals and medicines	3254	41.3	(D)	(D)
Other chemicals	325 (minus 3251-52, 3254)	(S) 18.2	(D)	(D)
Plastics and rubber products	326	13.3	0.0	(S) 13.3
Nonmetallic mineral products	327	3.3	(D)	(D)
Primary metals	331	(S) 5	(S) 0.1	(S) 4.9
Fabricated metal products	332	9.7	(S) 0.1	(S) 9.6
Machinery	333	52.0	(S) 0.5	(S) 51.5
Computer and electronic products	334	(S) 188.2	(S) 29.2	(S) 159
Computers and peripheral equipment	3341	21.3	(S) 0.3	(S) 21.0
Communications equipment	3342	(S) 42.9	(D)	(D)
Semiconductor and other electronic components	3344	(S) 52.5	(S) 0.3	(S) 52.2
Navigational, measuring, electromedical, and control instruments	3345	66.8	(S) 25.1	41.7
Other computer and electronic products	334 (minus 3341-42, 3344-45)	4.8	(D)	(D)
Electrical equipment, appliances, and components	335	23.6	(D)	(D)
Transportation equipment	336	138.8	(S) 37.7	101.1
Motor vehicles, trailers, and parts	3361-63	75.6	(D)	(D)
Aerospace products and parts	3364	(S) 55.3	(S) 35.6	(S) 19.7
Other transportation equipment	336 (minus 3361-64)	7.9	(D)	(D)
Furniture and related products	337	2.5	0.0	(S) 2.5
Miscellaneous manufacturing	339	14.3	(D)	(D)
Medical equipment and supplies	3391	10.3	(D)	(D)
Other miscellaneous manufacturing	339 (minus 3391)	4.0	0.0	4.0
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--
Small manufacturing companies [1]	Fewer than 50 employees	25.3	(D)	(D)

See explanatory information and SOURCE at end of table.

Table A-38. **Number of full-time equivalent (FTE) R&D scientists and engineers in companies that performed industrial R&D in the U.S., by industry and by size of company, by source of R&D funds: January 2000**

Page 2 of 3

Industry and size of company	NAICS codes	Total	Federal	Company
			[In thousands]	
Distribution by industry:				
Nonmanufacturing	21-23, 42, 44-81	437.1	29.6	407.5
Mining, extraction, and support activities	21	5.6	(D)	(D)
Utilities	22	0.7	(D)	(D)
Construction	23	8.1	(D)	(D)
Trade	42, 44, 45	120.1	(S) 0.5	119.6
Transportation and warehousing	48, 49	1.0	(D)	(D)
Information	51	113.9	12.3	101.6
Publishing	511	79.5	0.3	79.2
Newspaper, periodical, book, and database	5111	3.2	0.0	3.2
Software	5112	76.2	0.3	75.9
Broadcasting and telecommunications	513	(S) 15.7	(D)	(D)
Radio and television broadcasting	5131	(D)	(D)	(D)
Telecommunications	5133	(D)	(D)	(S) 8.8
Other broadcasting and telecommunications	513 (minus 5131, 5133)	0.4	0.0	0.4
Other information	51 (minus 511, 513)	18.7	(D)	(D)
Finance, insurance, and real estate	52, 53	16.7	(D)	(D)
Professional, scientific, and technical services	54	123.5	(S) 16.4	107.1
Architectural, engineering, and related services	5413	31.9	(D)	(D)
Computer systems design and related services	5415	36.8	1.4	(S) 35.4
Scientific R&D services	5417	48.0	(S) 7.8	40.2
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	6.8	(D)	(D)
Management of companies and enterprises	55	0.4	0.0	0.4
Health care services	621-23	3.9	(D)	(D)
Other nonmanufacturing	56, 61, 624, 71, 72, 81	5.8	(D)	(D)
Small nonmanufacturing companies [1]	Fewer than 15 employees	37.3	0.0	37.3

See explanatory information and SOURCE at end of table.

Table A-38. **Number of full-time equivalent (FTE) R&D scientists and engineers in companies that performed industrial R&D in the U.S., by industry and by size of company, by source of R&D funds: January 2000**

Industry and size of company		Total	Federal	Company
		[In thousands]		
Distribution by size of company: [Number of employees]				
Total		1,033.7	(S) 99.1	934.6
5 to 24		51.2	(D)	(D)
25 to 49		34.8	0.1	34.7
50 to 99		57.7	0.5	57.2
100 to 249		49.0	1.7	47.3
250 to 499		45.2	2.9	42.3
500 to 999		64.2	2.4	61.8
1,000 to 4,999		154.9	2.4	152.5
5,000 to 9,999		120.4	(D)	(D)
10,000 to 24,999		115.9	(S) 5.7	(S) 110.2
25,000 or more		(S) 340.4	(S) 70.9	269.5

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

The company R&D in this table is the industrial R&D performed within company facilities funded from all sources except the Federal Government. The funds predominantly are the company's own, but also include funds from outside organizations such as other companies, research institutions, universities and colleges, nonprofit organizations, and State governments. Excluded from this table are company-funded R&D not performed within the company (e.g., R&D contracted out to other organizations) and company-funded R&D not performed in the U.S. (e.g., R&D not performed on U.S. soil by foreign subsidiaries or other foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table A-39. **R&D funds per full-time equivalent (FTE) R&D scientist or engineer spent by c by industry, by size of company: 1999**

Industry	NAICS codes	Total	5 to 24	
Distribution by industry:				
All industries	21-23, 31-33, 42, 44-81	179,990	131,879	
Manufacturing	31-33	186,215	182,619	
Food	311	133,490	0	
Beverage and tobacco products	312	(D)	0	
Textiles, apparel, and leather	313-16	48,816	(D)	(S
Wood products	321	115,128	(D)	
Paper, printing and support activities	322, 323	(D)	0	
Petroleum and coal products	324	145,539	0	
Chemicals	325	245,501	0	(S
Basic chemicals	3251	164,637	0	
Resin, synthetic rubber, fibers, and filament	3252	(D)	0	
Pharmaceuticals and medicines	3254	(D)	0	
Other chemicals	325 (minus 3251-52, 3254)	(D)	0	(S
Plastics and rubber products	326	140,665	0	
Nonmetallic mineral products	327	(D)	0	
Primary metals	331	(S) 95,340	298,667	
Fabricated metal products	332	143,630	(D)	
Machinery	333	119,024	297,692	
Computer and electronic products	334	(S) 172,294	(D)	
Computers and peripheral equipment	3341	(D)	0	
Communications equipment	3342	(S) 101,257	0	
Semiconductor and other electronic components	3344	(S) 217,428	(D)	
Navigational, measuring, electromedical and control instruments	3345	224,855	0	
Other computer and electronic products	334 (minus 3341-42, 3344-45)	(D)	0	

See explanatory information and SOURCE at end of table.

panies that performed industrial R&D in the U.S.,

Size of company [number of employees]								
5 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
			[In dollars]					
42,024	145,358	136,754	173,744	129,386	168,549	146,373	209,270	216,767
62,569	142,851	124,890	106,543	130,193	165,138	(S) 144,919	(S) 211,451	(S) 227,527
0	42,495	63,732	70,593	75,941	144,616	146,768	(S) 83,175	(S) 229,740
0	0	0	0	(S) 0	83,329	(D)	(D)	(D)
99,200	(D)	65,410	104,632	(S) 104,862	127,380	117,712	(S) 126,906	(D)
0	143,887	192,071	(D)	(D)	96,761	(D)	(D)	0
0	0	(S) 118,648	14,901	153,473	122,178	(S) 66,354	(S) 194,604	(S) 236,518
0	103,039	0	227,125	(D)	(D)	(D)	(S) 206,731	(D)
15,160	115,631	155,687	51,874	140,106	214,286	204,980	284,938	(S) 296,279
11,529	143,505	(D)	27,001	(S) 119,330	(S) 204,937	195,557	140,761	(D)
0	0	0	(D)	0	(S) 216,937	(D)	(D)	(D)
0	(D)	163,680	(D)	162,493	278,506	(S) 319,232	329,772	(D)
15,432	55,252	135,573	83,802	153,162	113,988	118,516	(D)	(D)
0	84,916	89,891	171,306	118,490	127,385	(S) 206,688	126,458	(D)
0	14,082	201,306	237,551	(D)	121,063	(S) 143,936	(D)	0
0	110,068	(D)	90,777	136,382	(S) 115,023	(S) 112,122	(S) 50,254	(D)
33,165	32,590	58,853	96,977	128,168	87,705	119,849	(S) 182,564	(D)
05,932	43,769	87,316	76,507	82,945	112,533	125,344	156,920	(D)
85,219	24,850	161,960	150,201	153,772	171,259	136,322	(S) 201,196	(S) 184,591
59,190	111,007	87,565	204,075	116,199	109,558	161,319	(D)	(D)
0	0	230,045	(S) 125,491	(S) 130,197	108,758	(D)	(D)	(D)
0	68,718	176,034	168,700	128,046	212,795	263,968	(D)	(D)
0	1,584	109,980	114,789	200,225	205,519	(S) 122,215	(S) 274,522	(S) 270,782
24,667	(D)	266,929	(D)	185,001	(S) 192,963	(D)	0	0

Table A-39. **R&D funds per full-time equivalent (FTE) R&D scientist or engineer spent by by industry, by size of company: 1999**

Industry	NAICS codes	Total	
			5 to 24
Distribution by industry:			
Electrical equipment, appliances, and components	335	(D)	179,926
Transportation equipment	336	241,396	0
Motor vehicles, trailers, and parts	3361-63	(D)	0
Aerospace products and parts	3364	(S) 219,969	0
Other transportation equipment	336 (minus 3361-64)	(D)	0
Furniture and related products	337	108,988	0
Miscellaneous manufacturing	339	265,594	376,741
Medical equipment and supplies	3391	(D)	321,783
Other miscellaneous manufacturing	339 (minus 3391)	(D)	441,564
Other manufacturing	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--
Small manufacturing companies [1]	Fewer than 50 employees	113,204	61,698
Nonmanufacturing	21-23, 42, 44-81	169,913	290,425
Mining, extraction and support activities	21	(D)	0
Utilities	22	171,467	0
Construction	23	84,104	(S) 182
Trade	42, 44, 45	190,134	45,714
Transportation and warehousing	48, 49	518,455	458,332
Information	51	143,903	141,648
Publishing	511	152,149	136,874
Newspaper, periodical, book, and database	5111	118,602	0
Software	5112	153,625	136,874
Broadcasting and telecommunications	513	(D)	0

See explanatory information and SOURCE at end of table.

mpanies that performed industrial R&D in the U.S.,

Size of company [number of employees]								
25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In dollars]								
0	124,547	53,747	85,125	143,345	144,857	(S) 140,584	200,669	(D)
166,908	(D)	163,608	62,462	(S) 182,023	294,709	(S) 167,863	221,727	244,872
(D)	0	206,085	0	87,815	312,414	105,793	165,441	(D)
0	(D)	(D)	0	(D)	104,164	(S) 208,505	(D)	(S) 219,809
0	4,703	72,670	213,684	(D)	(D)	(D)	(D)	(D)
0	70,635	134,016	(S) 35,154	60,822	145,913	(S) 115,656	(S) 101,520	0
0	(S) 168,453	168,860	121,139	112,989	172,464	(S) 210,976	(D)	(D)
0	(S) 205,077	194,399	212,330	124,104	140,770	(S) 266,627	(D)	(D)
0	71,713	99,671	74,885	(S) 101,857	245,639	(D)	0	(D)
--	--	--	--	--	--	--	--	--
53,652	354,958	76,747	(D)	(D)	0	0	0	0
190,337	146,471	144,600	229,309	128,469	174,596	149,350	203,788	182,976
(D)	85,347	0	(D)	178,945	245,556	(S) 207,298	(D)	0
0	0	0	0	(D)	40,639	180,767	291,339	(D)
7,041	181,004	222,367	265,224	(D)	(D)	(D)	(D)	(D)
147,588	85,933	252,854	147,531	123,064	197,109	169,020	181,897	211,428
954,816	0	(D)	(D)	(D)	(D)	(D)	(D)	(D)
113,932	149,302	111,795	99,263	131,848	130,231	145,500	(D)	120,988
124,857	144,558	115,147	89,561	134,086	127,699	(D)	(D)	(D)
(D)	325,568	139,736	0	(D)	(D)	0	(D)	(D)
125,281	137,302	112,150	95,221	133,935	128,423	(D)	(D)	0
27,082	174,612	218,308	0	(D)	(D)	0	(D)	(S) 119,592

Table A-39. R&D funds per full-time equivalent (FTE) R&D scientist or engineer spent by co by industry, by size of company: 1999

Industry	NAICS codes	Total	5 to 24
Distribution by industry:			
Radio and television broadcasting	5131	(D)	0
Telecommunications	5133	(D)	0
Other broadcasting and telecommunications	513 (minus 5131, 5133)	(D)	0
Other information	51 (minus 511, 513)	(D)	(S) 167,172
Finance, insurance, and real estate	52, 53	(D)	86,817
Professional, scientific, and technical services	54	170,497	182,723
Architectural, engineering, and related services	5413	120,494	126,881
Computer systems design and related services	5415	(D)	170,783
Scientific R&D services	5417	252,874	255,688
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	(D)	93,545
Management of companies and enterprises	55	(D)	0
Health care services	621-23	172,458	81,055
Other nonmanufacturing	56, 61, 624, 71, 72, 81	(D)	268,200
Small nonmanufacturing companies [1]	Fewer than 15 employees	145,834	146,950

[1] The frame from which the statistical sample was selected was divided into two partitions based on total company company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sam selection of small companies by industry and the high sampling weights that sometimes were assigned to them. industry statistics from the small company partition were not possible. Statistics from the small company partitior Note that because companies were assigned to the "small company" partition of the sample based on preliminar during statistical processing, some companies' statistics are reported in size categories above the 50 employees For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES Starting with the 1999 survey, estimates are based on the North American Industry Classification Syste Standard Industrial Classification (SIC) system.

The number of full-time-equivalent R&D scientists and engineers used to estimate the cost per R&D sc January in two consecutive years. This number is then divided into the total R&D expenditures of the e

SOURCE National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research ar

companies that performed industrial R&D in the U.S.,

Size of company [number of employees]								
25 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to 4,999	5,000 to 9,999	10,000 to 24,999	25,000 or more
[In dollars]								
54,163	0	0	0	0	(D)	0	0	(D)
0	0	(D)	0	(D)	(D)	0	(D)	(S) 151,632
0	174,612	109,897	0	(D)	(D)	0	0	0
8,605	190,450	75,023	120,403	113,445	(S) 140,626	(D)	(D)	(D)
8,383	(S) 177,797	(D)	) 1,508,414	(D)	88,668	(S) 98,411	(S) 177,418	57,306
246,891	166,481	165,515	197,985	129,216	202,089	117,737	(D)	(D)
448,495	214,085	57,871	176,045	(D)	(S) 210,918	(D)	(D)	0
105,439	111,381	128,048	174,289	(S) 125,299	162,431	82,723	0	(D)
275,923	189,126	252,653	249,972	222,243	(D)	(D)	0	(D)
124,299	(S) 210,509	70,503	(D)	(D)	(S) 114,742	(D)	(D)	(D)
411,566	(D)	(D)	(D)	0	295,587	0	0	0
126,540	0	0	(D)	(D)	(D)	(D)	(D)	0
6,939	(S) 177,463	10,549	(S) 199,454	(D)	46,513	(D)	(D)	(D)
(S) 0	152,370	(D)	(D)	0	0	0	0	0

ny employment. In the manufacturing sector, companies with employment of 50 or more were included in the large
in the large company partition. Companies in the respective sectors with employment below these values,
mple this way was to reduce the variability in industry estimates largely attributed to the random year-to-year
. Because of this, detailed industry statistics were possible only from the large company partition; detailed
on are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals.
ary information available from the sampling frame and the number of employees may have been revised
es threshold for manufacturing companies and the 15 employee threshold for nonmanufacturing companies.

stem (NAICS). In prior years, estimates were based on the

scientist or engineer is the arithmetic mean of the numbers of R&D scientists and engineers reported for
earlier years, and the ratio is attributed to the earlier year.

and Development: 1999

Table A-40. **R&D funds per full-time equivalent (FTE) R&D scientist or engine ranked by size of R&D program: 1989-99**

Companies ranked by size of R&D program	1989 [1]	1990 [1]	1991 [1 2]	1992 [2]
First 4	218,100	219,600	213,200	202,49
Next 4	225,800	249,000	223,700	238,95
Next 12	148,700	129,100	159,900	170,27
Next 20	132,500	145,800	(S)	(S
Next 60	145,400	164,200	170,500	181,76
Next 100	141,900	137,000	169,000	173,10
Next 200	106,100	120,200	121,000	126,54
Average of above 400 R&D performing companies	161,500	161,200	169,000	158,09

[1] As a result of a new sample design, statistics for 1989-91 have been revised since originall firms in the nonmanufacturing industries and small firms in all industries. See the technica

[2] As a result of the new sample design, statistics for 1991 and later years are not directly cor notes for more information.

KEY (S) = Indicates imputation of more than 50 percent. Prior to 1994, data have bee

NOTE The number of full-time-equivalent R&D scientists and engineers used to estima scientists and engineers reported for January in two consecutive years. This nu ratio is attributed to the earlier year.

SOURCE National Science Foundation/Division of Science Resources Statistics, Survey o

neer spent by companies that performed industrial R&D in the U.S.,

	1993 [2]	1994 [2]	1995 [2]	1996 [2]	1997 [2]	1998 [2]	1999 [2]
		[In dollars]					
492	252,629	218,906	234,791	231,784	(S) 229,602	242,408	(S) 289,072
950	199,559	(S) 245,626	(S) 188,928	(S) 185,032	180,389	193,597	192,657
276	199,118	188,437	190,548	202,670	(S) 238,022	239,162	(S) 266,117
(S)	(S)	182,699	204,159	210,552	213,496	196,276	(S) 208,682
760	193,925	181,163	196,023	202,405	206,350	208,144	203,559
101	138,227	174,524	162,707	160,560	155,255	162,965	162,654
545	140,292	156,025	152,977	151,812	157,347	154,395	161,664
098	154,814	174,536	167,339	168,362	171,495	173,585	179,990

ally published. These statistics now better reflect R&D performance among
cal notes for more information.

omparable with statistics for 1990 and earlier years. See the technical

een withheld.

nate the cost per R&D scientist or engineer is the arithmetic mean of the numbers of R&D
number is then divided into the total R&D expenditures of the earlier year, and the

of Industrial Research and Development: 1999

Table A-41. **Full-time equivalent (FTE) R&D scientists and engineers per 1,000 employees in companies that performed industrial R&D in the U.S., by industry and by size of company: 1997-99**

Page 1 of 3

Industry and size of company	NAICS codes	1997 [1]	1998 [1]	1999
Distribution by industry:				
All industries	21-23, 31-33, 42, 44-81	47	55	45
Manufacturing	31-33	--	--	55
Food	311	8	10	8
Beverage and tobacco products	312	(S) 19	17	25
Textiles, apparel, and leather	313-16	9	8	31
Wood products	321	(S) 8	7	10
Paper, printing and support activities	322, 323	(S) 20	(S) 18	(S) 20
Petroleum and coal products	324	30	29	26
Chemicals	325	89	91	84
Basic chemicals	3251	68	89	60
Resin, synthetic rubber, fibers, and filament	3252	53	59	65
Pharmaceuticals and medicines	3254	144	141	133
Other chemicals	325 (minus 3251-52, 3254)	(S) 65	60	(S) 61
Plastics and rubber products	326	22	22	24
Nonmetallic mineral products	327	(S) 24	(S) 18	15
Primary metals	331	(S) 13	(S) 12	(S) 13
Fabricated metal products	332	19	17	13
Machinery	333	52	53	60
Computer and electronic products	334	137	152	(S) 147
Computers and peripheral equipment	3341	168	156	127
Communications equipment	3342	160	(S) 235	(S) 217
Semiconductor and other electronic components	3344	(S) 129	(S) 119	(S) 141
Navigational, measuring, electromedical, and control instruments	3345	(S) 122	(S) 125	133
Other computer and electronic products	334 (minus 3341-42, 3344-45)	128	114	112
Electrical equipment, appliances, and components	335	50	31	37
Transportation equipment	336	(S) 68	58	65
Motor vehicles, trailers, and parts	3361-63	56	46	64
Aerospace products and parts	3364	(S) 90	(S) 83	(S) 72
Other transportation equipment	336 (minus 3361-64)	22	21	40
Furniture and related products	337	13	(S) 12	10
Miscellaneous manufacturing	339	43	41	43
Medical equipment and supplies	3391	(S) 58	(S) 53	53
Other miscellaneous manufacturing	339 (minus 3391)	21	26	29

See explanatory information and SOURCE at end of table.

Table A-41. **Full-time equivalent (FTE) R&D scientists and engineers per 1,000 employees in companies that performed industrial R&D in the U.S., by industry and by size of company: 1997-99**

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Industry and size of company	NAICS codes	1997 [1]	1998 [1]	1999
Distribution by industry:				
Other manufacturing [2]	31-33 (minus 311-16, 321-27, 331-37, 339)	(S) 10	(D)	–
Small manufacturing companies [3]	Fewer than 50 employees	80	106	107
Nonmanufacturing	21-23, 42, 44-81	–	–	36
Mining, extraction, and support activities	21	27	27	16
Utilities	22	2	2	2
Construction	23	25	85	52
Trade	42, 44, 45	73	60	92
Transportation and warehousing	48, 49	2	1	1
Information	51	46	76	68
Publishing	511	156	197	230
Newspaper, periodical, book, and database	5111	11	22	26
Software	5112	309	310	344
Broadcasting and telecommunications	513	(S) 12	(S) 18	(S) 14
Radio and television broadcasting	5131	(D)	(D)	(D)
Telecommunications	5133	(S) 8	(S) 12	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	1	(D)	(D)
Other information	51 (minus 511, 513)	70	101	114
Finance, insurance, and real estate	52, 53	20	18	20
Professional, scientific, and technical services	54	158	144	173
Architectural, engineering, and related services	5413	141	156	180
Computer systems design and related services	5415	167	147	162
Scientific R&D services	5417	303	324	348
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	(S) 48	32	40
Management of companies and enterprises	55	(S) 212	302	65
Health care services	621-23	42	47	84
Other nonmanufacturing	56, 61, 624, 71, 72, 81	6	12	1
Small nonmanufacturing companies [3]	Fewer than 15 employees	286	254	173

See explanatory information and SOURCE at end of table.

Table A-41. **Full-time equivalent (FTE) R&D scientists and engineers per 1,000 employees in companies that performed industrial R&D in the U.S., by industry and by size of company: 1997-99**

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Industry and size of company		1997 [1]	1998 [1]	1999
Distribution by size of company: [Number of employees]				
Total		47	55	45
5 to 24		203	229	249
25 to 49		129	123	144
50 to 99		114	111	163
100 to 249		77	91	81
250 to 499		87	68	68
500 to 999		52	56	82
1,000 to 4,999		48	50	58
5,000 to 9,999		45	50	58
10,000 to 24,999		37	42	37
25,000 or more		(S) 39	47	28

[1] The totals for "all industries" prior to 1999 are identical to corresponding totals previously published using the Standard Industrial Classification (SIC) system. Detail published using the North American Industry Classification System (NAICS) may not add to the totals. See the 'NOTES' below.

[2] Manufacturing companies in the 1997 and 1998 samples that could not be classified with a NAICS code are included in "Other manufacturing"; nonmanufacturing companies that could not be classified with a NAICS code are included in " Other nonmanufacturing."

[3] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY:
(D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTE: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. For this table, companies in the 1997 and 1998 surveys were assigned NAICS industry codes based on their SIC industry codes. Consequently, the estimates for 1997 and 1998 in this table are not necessarily representative of the NAICS categories of industries in those years. They are included for comparison purposes only.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

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SURVEY METHODOLOGY[13]

REPORTING UNIT

The reporting unit for the Survey of Industrial Research and Development is the company[14], defined as a business organization of one or more establishments under common ownership or control. The survey includes two groups of enterprises: (1) companies known to conduct R&D, and (2) a sample representation of companies for which information on the extent of R&D activity is uncertain.

FRAME CREATION

The Standard Statistical Establishment List (SSEL), a Bureau of the Census compilation that contains information on more than 3 million establishments with paid employees, was the target population from which the frame used to select the 1999 survey sample was created (see table B-1 for population and sample sizes). For companies with more than one establishment, data were summed to the company level and the resulting company record was used to select the sample and process and tabulate the survey data.

After data were summed to the company level, each company then was assigned a single North American Industrial Classification System (NAICS)[15] code based on payroll. The method used followed the hierarchical structure of the NAICS. The company was first assigned to the economic sector, defined by a 2-digit NAICS code representing manufacturing, mining, trade, etc., that accounted for the highest percentage of its aggregated payroll. Then the company was assigned to a subsector, defined by a 3-digit NAICS code, that accounted for the highest percentage of its payroll within the economic sector. Finally, the company was assigned a 4-digit NAICS code within the subsector, again based on the highest percentage of its aggregated payroll within the subsector. Assignment below the 4-digit level was not done because of the concentration of R&D in relatively few industries and disclosure concerns (see below for detailed discussions of both issues).

The frame from which the survey sample was drawn included all for-profit companies classified in nonfarm industries. For surveys prior to 1992, the frame was limited to companies above certain size criteria based on number of employees.[16] These criteria varied by industry. Some industries were excluded from the frame because it was believed that they contributed little or no R&D activity to the final survey estimates. For the 1992 sample, new industries were added to the frame,[17] and the size criteria were lowered considerably and applied uniformly to firms in all industries. As a result, nearly 2 million enterprises with 5 or more employees[18] were given a chance of selection for subsequent samples, including the 1999 sample. For comparison, the frame for the 1987 sample included 154,000 companies of specified sizes and industries.

DEFINING SAMPLING STRATA

A fundamental change initiated in 1995 and repeated for subsequent samples was the redefinition of the sampling strata. For the survey years 1992-94, 165 sampling strata were established, each stratum corresponding to one or more 3-digit-level SIC codes. The objective was to select sufficient representation of industries to determine whether alternative or expanded publication levels were warranted. For the 1995-98 surveys, the sampling strata corresponded to publication level industry aggregations. For each year, 40 publication levels were defined. These correspond to the original 25 groupings of manufacturing industries used as sampling strata before 1992 and an additional 15 groupings of nonmanufacturing industries. For the 1999 survey, with the conversion to NAICS, 29 manufacturing and 20 nonmanufacturing strata were defined corresponding to the 4-digit industries and groups of industries for which statistics were developed and published.

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[13] Information for this section was provided by the Manufacturing and Construction Division of the U.S. Bureau of the Census, which collected and compiled the survey data for NSF. Copies of the technical papers cited can be obtained from NSF's Research and Development Statistics Program in the Division of Science Resources Statistics.

[14] In the Survey of Industrial Research and Development and in the publications presenting statistics resulting from the survey, the terms "company," "firm," and "enterprise" are used interchangeably. "Industry" refers to the 2-, 3-, or 4-digit North American Industrial Classification System (NAICS) codes or group of NAICS codes used to publish statistics resulting from the survey.

[15] The 1999 survey was the first year that companies were classified using NAICS. Prior to 1999, the Standard Industrial Classification (SIC) system was used. The two systems are discussed later under "Comparability of Statistics."

[16] See U.S. Bureau of the Census (1994d).

[17] These industries are listed and discussed below under "Comparability of Statistics."

[18] The survey excludes companies with fewer than 5 employees to limit burden on small business enterprises in compliance with the Office of Management and Budget's (OMB) charge to Federal government agencies to limit "significant economic impact on ... small entities."

IDENTIFYING CERTAINTY COMPANIES

The criteria for identifying companies selected for the survey with certainty, which were most recently modified in 1996, have remained the same for subsequent surveys. To limit the growth occurring each year in the number of certainty cases within the total sample, the certainty criterion was raised for the 1996 survey from $1 million to $5 million in total R&D expenditures based on data gathered from the 1995 survey. With a fixed total sample size, there was concern that the representation of the very large noncertainty universe by a smaller sample each year would be inadequate. Before 1994, companies with 1,000 or more employees had been selected with certainty, but it was observed that the level of spending varied considerably and that many of these companies reported no R&D expenditures each year. For these reasons, it was determined that these companies should be given chances of selection based upon the size of their R&D spending if they were in the previous survey or upon an estimated R&D value if they were not. Consequently, the size criterion based on the number of employees was dropped for surveys after 1994.

FRAME PARTITIONING

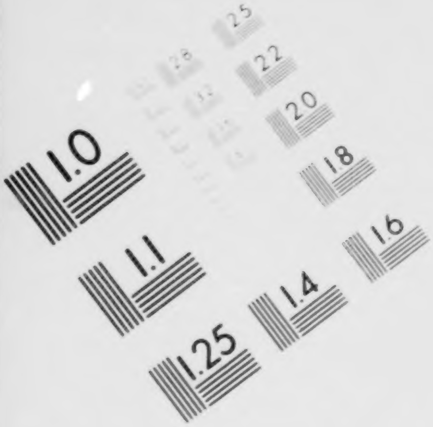
Partitioning of the frame for noncertainty companies into large and small companies was first introduced in 1994 because of concern arising from a study of 1992 survey results, which showed that a disproportionate number of small companies was being selected for the sample, and often assigned very large weights. These small companies seldom reported R&D activity. This disproportion was a result of the minimum probability rule (see "Sample Size" below) used as part of the independent probability proportionate to size (pps) sampling procedure employed exclusively prior to 1994 (pps is discussed in detail later under "Sample Selection"). This rule increased the probabilities of selection for several hundred thousand smaller companies. For the 1994 and subsequent surveys, simple random sampling (srs) was applied to the small company partition causing the smaller companies to be sampled more efficiently than with independent pps sampling since there was little variability in their size (srs is discussed in detail later under "Sample Selection"). The large company partition continued to be sampled using independent pps sampling.

In 1994 and 1995, total company payroll was the basis for partitioning the noncertainty frame. For each industry grouping, the largest companies representing the top 90 percent of the total payroll for the industry grouping was included in the pps frame. The balance, the smaller companies comprising the remaining 10 percent of payroll for the industry grouping, was included in the srs frame.

Beginning in 1996, total company employment became the basis for partitioning the frame. The total company employment levels defining the partitions were based on the relative contribution to total R&D expenditures of companies in different employment size groups in both the manufacturing and nonmanufacturing sectors. In the manufacturing sector, all companies with total employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, all companies with total employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values were included in the small company partition. In the 1999 survey, the large company partition contained almost 610,000 companies and the small company partition contained approximately 1.25 million companies. These counts were comparable to those in the 1998 survey (550,000 and 1.3 million, respectively).

IDENTIFYING "ZERO" INDUSTRIES

One final modification in the frame development for 1996, which was repeated for the 1997 and 1998 surveys, was the designation of "zero" industries in the large company partition. Zero industries were those three-digit SIC industries having no R&D expenditures reported in survey years 1992-94—the years when estimates by three-digit SIC industry were formed. These industries remained within the scope of the survey, but only a limited sample was drawn from them because it was unlikely that these industries conducted R&D. Simple random sampling was used to control the number of companies selected from these industries. For the 1999 survey, no zero industries were defined because this was the first year NAICS was used. For the next several cycles of the survey, NAICS industries will be evaluated to ascertain if any of them should be designated "zero" industries.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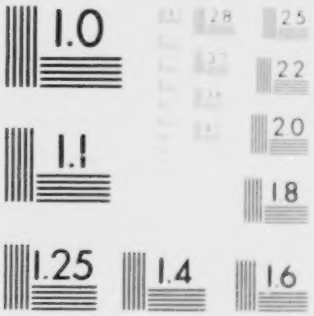
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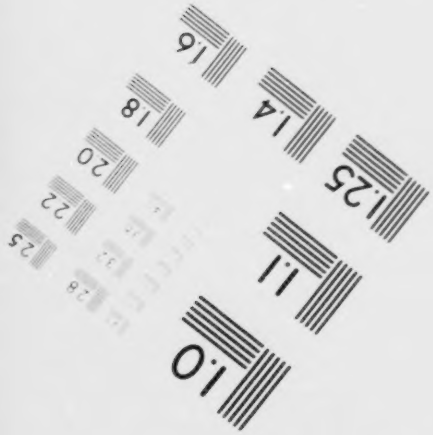
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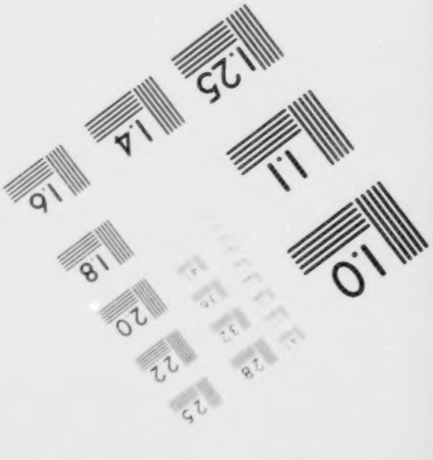
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SAMPLE SELECTION

Beginning with the 1996 cycle of the survey, a significant revision in the procedure for selecting samples from the partitions led to a change in the development and presentation of estimates. The revised procedure was repeated for subsequent surveys. For the 1995 survey, the sample of companies from the large company partition was selected using probability proportionate to size sampling (see below) in each of the 40 strata (discussed previously under "Defining Sampling Strata"). Likewise, the simple random sampling of the small company partition was done for each of the 40 strata. However, beginning in 1996, the number of strata established for the small company partition was reduced to two. One stratum consisted of small companies classified in manufacturing industries and the second stratum consisted of small companies classified in nonmanufacturing industries. Simple random sampling continued as the selection method for these two strata.

The purpose of selecting the small company panel from these two strata was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes occurred. As a consequence of this change, estimates for industry groups within manufacturing and nonmanufacturing were not possible from these two strata as noted on affected tables. The statistics for the detailed industry groups were based only on the sample from the large company partition. Estimates from the small company partition were included in statistics for total manufacturing, total nonmanufacturing, and all industries. For completeness, in the affected tables for 1996-98 the estimates also were added to the categories "other manufacturing" and "other nonmanufacturing." For 1999 the estimates are published separately in the "small manufacturing companies" and "small non-manufacturing companies" categories.

PROBABILITY PROPORTIONATE TO SIZE

Imputing R&D. It would be ideal if company size could be determined by its R&D expenditures. Unfortunately, except for the companies that were in a previous survey or for which there is information from external sources, it is impossible to know the R&D expenditures for every firm in the universe (i.e., R&D information *is not* available from the Standard Statistical Establishment List (SSEL)). Consequently, the probability of selection for most companies is based on estimated R&D expenditures. Since total payroll is known for each company in the universe (i.e., payroll information *is* available from the SSEL), it is possible to estimate R&D from payroll using relationships derived from previous survey data. Imputation factors relating these two variables are derived for each industry grouping. To impute R&D for a given company, the imputation factors are applied to the company payroll in each industry grouping. A final measure is obtained by adding the industry grouping components. The effect, in general, is to give firms with large payrolls higher probabilities of selection in agreement with the assumption that larger companies are more likely to perform R&D. Estimated R&D values are computed for companies in the small company partition as well. The aggregate of reported and estimated R&D from each company in both the large and small company partitions represent a total universe measure of the previous year's R&D expenditures. However, assigning R&D to every company results in an overstatement of this measure. To adjust for the overstatement, the universe measure is scaled down using factors developed from the relationship between the frame measure of the prior year's R&D and the final prior-year survey estimates. These factors, computed at levels corresponding to published industry levels, are used to adjust the originally imputed R&D values so that the new frame total for R&D at these levels approximates the prior year's published values. This adjustment provides for better allocation of the sample among these levels.

For 1999, the distribution of companies by payroll and estimated R&D in the large company partition was skewed as in earlier frames (i.e., the correlation of payroll and R&D was high because R&D had been estimated based on payroll). Because of this skewness, pps sampling remained the appropriate selection technique for this group. (Had there been a zero-industry stratum in the 1999 sample, it would have been sampled as discussed previously under "Identifying "Zero" Industries"). That is, large companies had higher probabilities of selection than did small companies. However, a different approach to pps sampling was introduced beginning with the 1998 survey. Historically, pps sampling had been accomplished using an independent sampling methodology, i.e., the selection (or nonselection) of a given company was independent of the sampling result (select or nonselect) of any other company. This implied that over repeated samplings in a given stratum, different size samples would result.

This added more variability to the sample estimates. For 1998, a fixed sample size pps method was introduced. This method ensured that the sample size desired for a given stratum was achieved, thus eliminating error because of sample size variation from the sample estimates. For a given sample size, the fixed sample size method will produce more precise estimates on average than the independent method. The fixed sample size methodology was repeated for the 1999 survey.

SIMPLE RANDOM SAMPLING

As described earlier, only two major strata were defined for samples in the small company partition, manufacturing and nonmanufacturing. The use of srs implied that each company within a stratum had an equal probability of selection. The total sample allocated to the small company partition was dependent upon the total sample specified for the survey and upon the total sample necessary to satisfy criteria established for the large partition. Once determined, the allocation of this total by stratum was made proportionate to the stratum's payroll contribution to the entire partition.

SAMPLE STRATIFICATION AND RELATIVE STANDARD ERROR CONSTRAINTS

The particular sample selected was one of a large number of samples of the same type and size that by chance might have been selected. Statistics resulting from the different samples would differ somewhat from each other. These differences are represented by estimates of sampling error or variance. The smaller the sampling error, the more precise the statistic.

Controlling Sampling Error. Historically, it has been difficult to achieve control over the sampling error of survey estimates. Efforts were confined to controlling the amount of error due to sample size variation, but this was only one component of the overall sampling error. The other component depended on the correlation between the data from the sampling frame used to assign probabilities (namely R&D values either imputed or reported in the previous survey) and the actual current year reported data. The nature of R&D is such that these correlations could not be predicted with any reliability. Consequently, precise controls on overall sampling error were difficult to achieve.

For recent surveys, primary concern was placed on controlling error for the large company partition since nearly all of the R&D activity was identified from that portion of the sample. For the 1998 and 1999 surveys, with the introduction of the fixed sample size sampling procedure, the component of sampling error due to sample size variation was eliminated. However, the amount of error attributable to the remaining component of the sample remained. Since there was still no way to predict how well the data from the sampling frame would correlate with actual survey data, the approach taken to allocate the sample across the various strata was to assign probabilities in the same manner as in the past when independent sampling was used. The probabilities resulting from this allocation technique determined the sample sizes to be selected from each stratum subject to the overall sample size constraint dictated by the survey budget. Although the actual survey sampling errors could not be predicted, the parameters used to assign probabilities, and the use of the minimum probability rule resulted in a desirable number of companies being sampled from the large company partition (see "Sample Size" below).

Sampling Strata and Standard Error Estimates. A limitation of the sample allocation process for the large company partition should be noted. The constraints used to control the sample size in each stratum were based on a universe total that, in large part, was improvised. That is, as previously noted, an R&D value was assigned to every company in the frame, even though most of these companies actually may not have had R&D expenditures. The value assigned was imputed for the majority of companies in the frame and, as a consequence, the estimated universe total and the distribution of individual company values, even after scaling, did not necessarily reflect the true distribution. Assignment of sampling probability was nevertheless based on this distribution. The presumption was that actual variation in the sample design would be less than that estimated, because many of the sampled companies have true R&D values of zero, not the widely varying values that were imputed using total payroll as a predictor of R&D. Previous sample selections indicate that in general this presumption held, but exceptions have occurred when companies with large sampling weights have reported large amounts of R&D spending. See table B-2 for a list by industry of the standard error estimates for selected items and table B-3 for a list of the standard error estimates of total R&D by state.

Nonsampling Error. In addition to sampling error, estimates are subject to nonsampling error. Errors are grouped in five categories: specification, coverage, response, nonresponse, and processing. For detailed discussions on the sources, control, and measurement of each of these types of error, see U.S. Bureau of the Census (1994b and 1994f).

SAMPLE SIZE

The parameters set to control sampling error discussed above resulted in a sample size of 18,529 companies from the large company partition. For the small company partition, two strata (manufacturing and nonmanufacturing) were identified. Also included was a separate stratum of small companies that could not be classified into a NAICS industry because of incomplete industry identification in the SSEL. In 1999, as in the 1994 through 1998 surveys, a small number of companies was selected from this group in the hope that an accurate industry identification could be obtained at a later point. Ultimately, a final sample of 5,902 companies was selected from the small company partition. The sample initially allocated to the two strata was proportionate to its share of total payroll for the small company partition. The total sample size finally determined for the 1999 survey was 24,431. This total included an adjustment to the sample size based on a minimum probability rule and changes in the operational status of some companies. With the use of fixed sample size pps sampling for the large company partition and simple random sampling for the small company partition (and with no zero-industry stratum for 1999), the target sample size was met.

Minimum Probability Rule. A minimum probability rule was imposed for both partitions. As noted earlier, for the large partition, probabilities of selection proportionate to size were assigned to each company, where size was the reported or imputed R&D value assigned to each company. Selected companies received a sample weight which was the inverse of their probability. Selected companies that ultimately report R&D expenditures vastly larger than their assigned values can have adverse effects on the statistics, which were based on the weighted value of survey responses. To lessen the effects on the final statistics, the maximum weight of a company was controlled by specifying a minimum probability that could be assigned to the company. If the probability, based on company size, was less than the minimum probability, then it was reset to this minimum value. The consequence of raising these original probabilities to the minimum probability was to raise the sample size. Similarly, a maximum weight for each stratum was established for the simple random sampling of the small company partition. If the sample size initially allocated to a stratum resulted in a stratum weight above this maximum value, then the sample size was increased until the maximum weight was achieved.

Changes in Operational Status. Between the time that the frame was created and the survey was prepared for mailing, the operational status of some companies changed. That is, they were merged with or acquired by another company, or they were no longer in business. Before preparing the survey for mailing, the operational status was updated to identify these changes. As a result, the number of companies mailed a survey form was somewhat smaller than the number of companies initially selected for the survey.

WEIGHTING AND MAXIMUM WEIGHTS

Weights were applied to each company record to produce national estimates. Within the pps partitions of the sample, company records were given weights up to a maximum of 50; for companies within the srs partitions, company records were given weights up to a maximum of 250.

SURVEY FORMS

Two forms are used each year to collect data for the survey. Known large R&D performers are sent a detailed survey form, Form RD-1.[19] The Form RD-1 requests data on sales or receipts, total employment, employment of scientists and engineers, expenditures for R&D performed within the company with Federal funds and with company and other funds, character of work (basic research, applied research, and development), company-sponsored R&D expenditures in foreign countries, R&D performed under contract by others, federally funded R&D by contracting agency, R&D costs by type of expense, domestic R&D expenditures by state, energy-related R&D and foreign R&D by country. Because companies receiving the Form RD-1 have participated in previous surveys, computer-imprinted data reported by the company for the previous year are supplied for reference. Companies are encouraged to revise or update this imprinted data if they have more current information; however, prior-year statistics that had been previously published were revised only if large disparities were reported.

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[19] Form RD-1 is a revised version of the Form RD-1L, formerly used to collect data from large R&D performers for odd-numbered years. For even-numbered years, an abbreviated questionnaire, Form RD-1S was used. Beginning in 1998 the Form RD-1L was streamlined, renamed Form RD-1, and the odd/even-numbered year cycle abandoned.

Small R&D performers and firms included in the sample for the first time were sent Form RD-1A. This form collects the same information as Form RD-1 except for five items: Federal R&D support to the firm by contracting agency, R&D costs by type of expense, domestic R&D expenditures by state, energy-related R&D, and foreign R&D by country. It also includes a screening item that allows respondents to indicate that they do not perform R&D. No prior-year information is made available since the majority of the companies that receive the Form RD-1A have not been surveyed in the previous year.

RECENT SURVEY FORM CONTENT CHANGES

For the 1997 and 1998 surveys, data on federally-funded and total R&D performed under contract to others (or "contracted-out") were collected to better measure the amount of R&D performed both within and between companies. For earlier years, data were collected only on non-federally funded contracted-out R&D.[20]

Based on information obtained from telephone interviews with a sample of respondents, a new item, R&D depreciation costs, was added to the 1998 Form RD-1. In prior years R&D depreciation was included in the "other costs" category of R&D expenditures. Also beginning with the 1998 survey, items used to collect detailed information on the allocation of R&D expenditures by field of science and engineering and by product class, and R&D expenditures for pollution abatement were eliminated. Further, the amount of detail requested for energy-related R&D was reduced. Item nonresponse on each of these items was unacceptably high relative to their response burden.

For 1999, the survey forms remained as they were for 1998.

NUMBER OF SURVEY FORMS SENT

Form RD-1 was mailed to companies that reported R&D expenditures of $5 million dollars or more in the 1998 survey. Approximately 1,600 companies received Form RD-1 and approximately 22,600 received Form RD-1A. Both survey forms and the instructions provided to respondents are reproduced in section C, Survey Documents.

FOLLOW-UP FOR SURVEY NONRESPONSE

The 1999 survey forms were mailed in March 2000. Recipients of Form RD-1A were asked to respond within 30 days, while Form RD-1 recipients were given 60 days. A follow-up form and letter were mailed to RD-1A recipients every thirty days if their completed survey form had not been received; a total of five follow-up mailings were conducted for delinquent RD-1A recipients.

A letter was mailed to Form RD-1 recipients thirty days after the initial mailing, reminding them that their completed survey forms were due within the next 30 days. A second form and reminder letter were mailed to Form RD-1 respondents after 60 days. Two additional follow-up mailings were conducted for delinquent Form RD-1 recipients.

In addition to the mailings, telephone follow-up was used to encourage response from those firms ranked among the 300 largest R&D performers, based on total R&D expenditures reported in the previous survey. Table B-4 shows the number of companies in each industry or industry group that received a survey form and the percentage that responded to the survey.

IMPUTATION FOR ITEM NONRESPONSE

For various reasons, many firms chose to return the survey form with one or more blank items.[21] For some firms, internal accounting systems and procedures may not have allowed quantification of specific expenditures. Others may have refused to answer any voluntary questions as a matter of company policy.[22]

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[20] The tables produced from the data collected in both the 1997 and 1998 surveys were "spotty." That is, since federally funded R&D contracted-out to others was reported by so few companies, most of the resulting statistics arrayed by industry had to be suppressed because of confidentiality and, consequently, the tables were not published. In the 1997 table, even the "all industries" total had to be suppressed, so no meaningful estimate can be made for that year. However, for 1998, the "all industries" total was $4.3 billion. We will continue to tabulate this item and report the aggregated figure when possible.

[21] For detailed discussions on the sources, control, and measurement error resulting from item nonresponse, see U.S. Bureau of the Census (1994b).

When respondents did not provide the requested information, estimates for the missing data were made using various methods. Specific rules govern imputation for missing data depending on the item being imputed. For some items (domestic sales, total employment, total R&D, and number of research scientists and engineers) missing current year data are always imputed. Rates of change are applied to prior year data regardless of whether prior year data were reported or imputed. For other items (e.g., basic research, subcontracted R&D, and foreign R&D) missing current year data are imputed only if the company reported the item in either of the prior two years. A third type of imputation occurs when detail does not sum to the total (e.g. Federal R&D by agency). In this case if prior year detail is not imputed, then current year data are distributed based on the previous distribution pattern of the reporting unit. Otherwise, an industry average distribution is applied to the total to derive a value for each detailed item. Rates of change are calculated by item within each NAICS category or industry. The calculations are based on weighted data for all companies that reported both variables. In the case of inter-item ratios (e.g., R&D to sales), calculations are based on data for all companies that reported both items in the current reporting period. For current to prior year ratios (e.g., employment), calculations are based on data for all companies that reported that item in both years.

Outside sources of information are also used for imputing missing data. During the edit review process, analysts compare data reported to the Survey of Industrial Research and Development by publicly-owned companies with the company's report to the Securities and Exchange Commission (SEC). Data items matched include domestic sales, domestic employment, total or company-funded R&D, and in some cases federally-funded R&D. This comparison provides analysts a means to 1) potentially resolve inconsistencies between current and prior year data on the R&D survey, 2) impute missing data for specific items, and 3) ensure that companies are reporting comparable values in both reports. A second source for verifying or obtaining domestic employment and domestic sales data is the U.S. Census Bureau's Business Register. Data for these items are collected on economic census and annual survey forms.[23] Table B-5 contains imputation rates for the principal survey items.

RESPONSE RATES AND MANDATORY VERSUS VOLUNTARY REPORTING

Current survey reporting requirements divide survey items into two groups: mandatory and voluntary. Response to four data items on the survey forms, total R&D expenditures, Federal R&D funds, net sales, and total employment, was mandatory, whereas response to the remaining items was voluntary. During the 1990 survey cycle, NSF conducted a test of the effect of reporting on a completely voluntary basis to determine if combining both mandatory and voluntary items on one survey form influences response rates. For this test, the 1990 sample was divided into two panels of approximately equal size. One panel, the mandatory panel, was asked to report as usual on four mandatory items with the remainder voluntary; and the other panel was asked to report all items on a completely voluntary basis. The result of the test was a decrease in the overall survey response rate to 80 percent from levels of 88 percent in 1989 and 89 percent in 1988. The response rates for the mandatory and voluntary panels were 89 and 69 percent, respectively. Detailed results of the test were published in *Research and Development in Industry: 1990*. For firms that reported R&D expenditures in 1999, table B-6 shows the percentage that also reported data for other selected items.

CHARACTER OF WORK ESTIMATES

Response to questions about character of work (basic research, applied research, and development) declined in the mid-1980s, and, as a result, imputation rates increased. The general imputation procedure described above became increasingly dependent upon information imputed in prior years, thereby distancing current year estimates from any reported information. Because of the increasing dependence on imputed data, NSF chose not to publish character of work estimates in 1986. The imputation procedure used to develop these estimates was revised in 1987 for use with later data and differs from the general imputation approach. The new method calculated the character of work distribution for a nonresponding firm only if that firm reported a distribution within a 5-year period, extending from 2 years before to 2 years after the year requiring imputation. Imputation for a given year was initially performed in the year the data were collected and was based on a character of work distribution reported in either of the 2 previous years, if any. It was again performed using new data collected in the next 2 years. If reported data followed no previously imputed or reported data, previous period estimates were inserted based on the currently reported information. Similarly, if reported data did not follow 2 years of imputed data, the 2 years of previously imputed data were removed. Thus, character of work estimates were revised as newly reported information became available and were not final for 2 years following their initial publication.

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[22] All but four items—total R&D, Federal R&D, net sales, and total employment, which are included in the Census Bureau's annual mandatory statistical program—are voluntary. See further discussion under "Response Rates and Mandatory Versus Voluntary Reporting" later in this section.

[23] For detailed descriptions and analyses of the imputation methods and algorithms used, see U.S. Bureau of the Census (1994c).

Beginning with 1995, previously estimated values were not removed for firms that did not report in the third year, nor were estimates made for the 2 previous years for firms reporting after 2 years of nonresponse. This process was changed because, in the prior period, revisions were minimal. Estimates continued to be made for 2 consecutive years of nonresponse and discontinued if the firm did not report character of work in the third year. If no reported data were available for a firm, character of work estimates were not imputed. As a consequence, only a portion of the total estimated R&D expenditures were distributed at the firm level. Those expenditures not meeting the requirements of the new imputation methodology were placed in a "not distributed" category. Table B-7 shows the character of work estimates along with the "not distributed" component for 1999.

NSF's objective in conducting the survey has always been to provide estimates for the entire population of firms performing R&D in the United States. However, the revised imputation procedure would no longer produce such estimates because of the "not distributed" component. A baseline estimation method thus was developed to allocate the "not distributed" amounts among the character of work components. In the baseline estimation method, the "not distributed" expenditures were allocated by industry group to basic research, applied research, and development categories using the percentage splits in the distributed category for that industry. The allocation was done at the lowest level of published industry detail only; higher levels were derived by aggregation, just as national totals were derived by aggregation of individual industry estimates, and result in higher performance shares for basic and applied research and lower estimates for development's share than would have been calculated using the previous method. The estimates of basic research, applied research, and development provided in the tables in section A were calculated using the baseline estimation method.

STATE ESTIMATES

Form RD-1 requested that the total cost of R&D be distributed for the state(s) where the R&D is performed. An independent source, the *Directory of American Research and Development*, published by the Data Base Publishing Group of the R. R. Bowker Company, last published for 1997, was used in conjunction with previous survey results to estimate R&D expenditures by state for companies that did not provide this information. The information on scientists and engineers published in the directory was used as a proxy indicator of the proportion of R&D expenditures within each state. R&D expenditures by state were estimated by applying the distribution of scientists and engineers by state from the directory to total R&D expenditures for these companies. These estimates were included with reported survey data to arrive at published estimates of R&D expenditures for each state.

COMPARABILITY OF STATISTICS

This section summarizes survey improvements, enhancements, and changes in procedures and practices that may have affected the comparability of statistics produced from the Survey of Industrial Research and Development over time and with other statistical series.[24]

INDUSTRY CLASSIFICATION SYSTEM

Beginning with the 1999 cycle of the survey, industry statistics are published using the North American Industrial Classification System (NAICS). The ongoing development of NAICS has been a joint effort of statistical agencies in Canada, Mexico, and the United States. The system replaced the Standard Industrial Classification (1980) of Canada, the Mexican Classification of Activities and Products (1994), and Standard Industrial Classification (SIC, 1987) of the United States.[25] NAICS was designed to provide a production-oriented system under which economic units with similar production processes are classified in the same industry. NAICS was developed with special attention to classifications for new and emerging industries, service industries, and industries that produce advanced technologies. NAICS not only eases comparability of information about the economies of the three North American countries, but it also increases comparability with the two-digit level of the United Nations' International Standard Industrial Classification (ISIC) system. Important for the Survey of Industrial Research and Development is the creation of several new classifications that cover major performers of R&D in the U.S. Among manufacturers, the computer and electronic products classification (NAICS 334) includes makers of computers and peripherals, semiconductors, and navigational and electromedical instruments. Among nonmanufacturing industries are information (NAICS 51) and professional, scientific, and technical services (NAICS 54). Information includes publishing, both paper and electronic, broadcasting, and telecommunications. Professional, scientific, and technical services includes a variety of industries. Of specific importance for the survey are engineering and scientific R&D service industries.

Effects of NAICS on Survey Statistics. The change of industry classification system affects most of the detailed statistical tables produced from the survey. In this report, some tables which contain industry statistics from the 1997 and 1998 cycles of the survey, previously classified using the SIC system, have been reclassified using the new NAICS codes. This has been done to provide a bridge for users who want to make year-to-year comparisons below the aggregate level.

COMPANY SIZE CLASSIFICATIONS

Beginning with the 1999 cycle of the survey, the number of company size categories used to classify survey statistics was increased. The original 6 categories were expanded to 10 to emphasize the role of small companies in R&D performance. During 1998, companies with fewer than 500 employees spent $30.2 billion on industrial R&D performed in the United States. During 1999, they spent $34.1 billion (NSF 2001a). Of this amount, 21 percent ($7.0 billion) was spent by the smallest companies (those with at least 5 but fewer than 25 employees). The 1999 statistics further show that there was more growth in the amount of R&D performed by smaller companies than in the amount performed by larger companies. The more detailed business size information also facilitates better international comparisons. Generally, statistics produced by foreign countries that measure their industrial R&D enterprise are reported with more detailed company size classifications at the lower end of the scale than U.S. industrial R&D statistics traditionally have been.[26] The new classifications of the U.S. statistics will enable more direct comparisons with other countries' statistics.

REVISIONS TO HISTORICAL AND IMMEDIATE PRIOR YEAR STATISTICS

Revisions to historical statistics usually have been made because of changes in the industry classification of companies caused by changes in payroll composition detected when a new sample was drawn. Various methodologies have been adopted over the years to revise, or backcast, the data when revisions to historical statistics have become necessary. Documented revisions to the historical statistics from post-1967 surveys through 1992 are summarized in NSF (1994) and in annual reports for subsequent surveys. Detailed descriptions of the specific revisions made to the statistics from pre-1967 surveys are scarce, but U.S. Bureau of the Census (1995) summarizes some of the major revisions.

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[24] See also U.S. Bureau of the Census (1995).

[25] For a detailed comparison of NAICS to the Standard Industrial Classification (1987) of the United States, visit http://www.census.gov/epcd/www/naics.html.

[26] For more information, visit the Organisation for Economic Co-operation and Development (OECD) website at http://www.oecd.org.

Changes to reported data can come from three sources: respondents, analysts involved in survey and statistical processing, and the industry reclassification process. Prior to 1995, routine revisions were made to prior year statistics based on information from all three sources. Consequently, results from the current year survey were used not only to develop current year statistics, but also to revise immediate prior year statistics. Beginning with the 1995 survey, this practice was discontinued. The reasons for discontinuation of this practice were annual sampling, continual strengthening of sampling methodology, and improvements in data verification, processing, and nonresponse follow-up. Moreover, it was not clear that respondents or those who processed the survey results had any better information a year after the data were first reported. Thus, it was determined that routinely revising published survey statistics increased the potential for error and often confused users of the statistics. Revisions are now made to historical and immediate prior year statistics only if substantive errors are discovered.

YEAR-TO-YEAR CHANGES

Comparability from year to year may be affected by new sample design, annual sample selection, and industry shifts.

SAMPLE DESIGN

By far the most profound influence on statistics from recent surveys occurred when the new sample design for the 1992 survey was introduced. Revisions to the 1991 statistics were dramatic (see *Research and Development in Industry: 1992* for a detailed discussion). While the allocation of the sample was changed somewhat, the sample designs used for subsequent surveys were comparable to the 1992 sample design in terms of size and coverage.

ANNUAL SAMPLE SELECTION

With the introduction of annual sampling in 1992, more year-to-year change has resulted than when survey panels were used. There are two reasons why this was so. First, changes in classification of companies not surveyed are not reflected in the year-to-year movement. Prior to annual sampling, a wedging operation—which was performed when a new sample was selected—was a means of adjusting the data series to account for the changes in classification that occurred in the frame (see the discussion on wedging later under "Time Series Analyses"). Second, yearly correlation of R&D data is lost when independent samples are drawn each year.

INDUSTRY SHIFTS

The industry classification of companies is redefined each year with the creation of the sampling frame. By redefining the frame, the sample reflects current distributions of companies by size and industry. A company may move from one industry to another because of either changes in its payroll composition, which is used to determine the industry classification code (see previous discussion under "Frame Creation"); changes in the industry classification system itself; or changes in the way the industry classification code was assigned or revised during survey processing.

A company's payroll composition can change because of the growth or decline of product or service lines, the merger of two or more companies, the acquisition of one company by another, divestitures, or the formation of conglomerates. Although an unlikely occurrence, a company's industry designation could be reclassified yearly with the introduction of annual sampling. The result is that a downward movement in R&D expenditures in one industry is balanced by an upward movement in another industry from one year to the next.

From time to time, the industry coding system, used by Federal agencies that publish industry statistics, is changed or revised to reflect the changing composition of U.S. and North American industry. For statistics developed for 1988–91 from the 1988–91 surveys, companies retained the Standard Industrial Classification (SIC) codes assigned for the 1987 sample. These classifications were based on the 1977 SIC system. Since the last major revision of the SIC system was in 1987, this revision was used to classify companies in the 1992-98 surveys. As discussed above, the industrial classification system has been completely changed and, beginning with the 1999 cycle of the survey, the North American Industrial Classification System (NAICS) is now used.

The method used to classify firms during survey processing was revised slightly in 1992. Research has shown that the impact on individual industry estimates was minor.[27] The current method used to classify firms was discussed previously under "Frame Creation." Methods used for past surveys are discussed in U.S. Bureau of the Census (1995).

CAPTURING SMALL AND NONMANUFACTURING R&D PERFORMERS[28]

Before the 1992 survey, the sample of firms surveyed was selected at irregular intervals.[29] In intervening years, a panel of the largest firms known to perform R&D was surveyed. For example, a sample of about 14,000 firms was selected for the 1987 survey. For the 1988–91 studies, about 1,700 of these firms were resurveyed annually; the other firms did not receive survey forms, and their R&D data were estimated. This sample design was adequate during the survey's early years because R&D performance was concentrated in relatively few manufacturing industries. However, as more and more firms began entering the R&D arena, the old sample design proved increasingly deficient because it did not capture births of new R&D-performing firms. The entry of fledgling R&D performers into the marketplace was completely missed during panel years. Additionally, beginning in the early 1970s, the need for more detailed R&D information for nonmanufacturing industries was recognized. At that time, the broad industry classifications "miscellaneous business services" and "miscellaneous services" were added to the list of industry groups for which statistics were published. By 1975, about 3 percent of total R&D was performed by firms in nonmanufacturing industries.

During the mid-1980s, there was evidence that a significant amount of R&D was being conducted by an increasing number of nonmanufacturing firms; again, the number of industries used to develop the statistics for nonmanufacturers was increased. Consequently, since 1987 the annual reports in this series have included separate R&D estimates for firms in the communication, utility, engineering, architectural, research, development, testing, computer programming, and data processing service industries; hospitals; and medical labs. Approximately 9 percent of the estimated industrial R&D performance during 1987 was undertaken by nonmanufacturing firms.

After the list of industries for which statistics were published was expanded, it became clear that the sample design itself should be changed to reflect the widening population of R&D performers among firms in the nonmanufacturing industries[30] and small firms in all industries so as to account better for births of R&D-performing firms and to produce more reliable statistics. Beginning with the 1992 survey, NSF decided to (1) draw new samples with broader coverage annually, and (2) increase the sample size to approximately 25,000 firms.[31] As a result of the sample redesign, for 1992 the reported nonmanufacturing share was (and has continued to be) 25-30 percent of total R&D.[32]

TIME-SERIES ANALYSES

The statistics resulting from this survey on R&D spending and personnel are often used as if they were prepared using the same collection, processing, and tabulation methods over time. Such uniformity has not been the case. Since the survey was first fielded, improvements have been made to increase the reliability of the statistics and to make the survey results more useful. To that end, past practices have been changed and new procedures instituted. Preservation of the comparability of the statistics has, however, been an important consideration in making these improvements. Nonetheless, changes to survey definitions, the industry classification system, and the procedure used to assign industry codes to multi-establishment companies have had some, though not substantial, effects on the comparability of statistics.[33]

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[27] The effects of changes in the way companies were classified during survey processing are discussed in detail in U.S. Bureau of the Census (1994c and 1994a).

[28] See also NSF (1994, 1995, and 1996a).

[29] Until 1967, samples were selected every 5 years. Subsequent samples were selected for 1971, 1976, 1981, and 1987.

[30] For the 1992 survey, 25 new nonmanufacturing industry and industry groups were added to the sample frame: agricultural services (SIC 07); fishing, hunting, and trapping (SIC 09); wholesale trade–nondurables (SIC 51); stationery and office supply stores (SIC 5112); industrial and personal service paper (SIC 5113); groceries and related products (SIC 514); chemicals and allied products (SIC 516); miscellaneous nondurable goods (SIC 519); home furniture, furnishings, and equipment stores (SIC 57); radio, TV, consumer electronics, and music stores (SIC 573); eating and drinking places (SIC 581); miscellaneous retail (59); nonstore retailers (SIC 596); real estate (SIC 65); holding and other investment offices (SIC 67); hotels, rooming houses, camps, and other lodging places (SIC 70); automotive repair, services, and parking (SIC 75); miscellaneous repair services (SIC 76); amusement and recreation services (SIC 79); health services (SIC 80); offices and clinics of medical doctors (SIC 801); offices and clinics of other health practitioners (SIC 804); miscellaneous health and allied services not elsewhere classified (SIC 809); engineering, accounting, research, management, and related services (SIC 87); and management and public relations services (SIC 874).

[31] Annual sampling also remedies the cyclical deterioration of the statistics that results from changes in a company's payroll composition because of product line and corporate structural changes.

[32] See also NSF (1997a, 1998a, 1999b, and 2000b).

The aspect of the survey that had the greatest effect on comparability was the selection of samples at irregular intervals (i.e., 1967, 1971, 1976, 1981, 1987, and 1992) and the use of a subset or panel of the last sample drawn to develop statistics for intervening years. As discussed earlier, this practice introduced cyclical deterioration of the statistics. As compensation for this deterioration, periodic revisions were made to the statistics produced from the panels surveyed between sample years. Early in the survey's history, various methods were used to make these revisions.[34] After 1976 and until the 1992 advent of annual sampling, a linking procedure called wedging was used.[35] In wedging, the 2 sample years on each end of a series of estimates served as benchmarks in the algorithms used to adjust the estimates for the intervening years.[36]

COMPARISONS TO OTHER STATISTICAL SERIES

NSF collects data on federally financed R&D from both Federal funding agencies—using the Survey of

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[33] For discussions of each of these changes, see U.S. Bureau of the Census (1994g); for considerations of comparability, see U.S. Bureau of the Census (1994e and 1993).

[34] See U.S. Bureau of the Census (1995).

[35] The process was dubbed wedging because of the wedgelike area produced on a graph that compares originally reported statistics with the revised statistics that resulted after linking.

[36] For a full discussion of the mathematical algorithm used for the wedging process that linked statistics from the 1992 survey with those from the 1987 survey, see U.S. Bureau of the Census (1994g). In general, wedging

> *takes full advantage of the fact that in the first year of a new panel [when a new sample is selected], both current year and prior-year estimates are derived. Thus, two independent estimates exist for the prior year. The estimates from the new panel are treated as superior primarily because the new panel is based on updated classifications [the industry classifications in the prior panel are frozen] and is more fully representative of the current universe (the prior panel suffers from panel deterioration, especially a lack of birth updating). The limitations in the prior panel caused by these factors are naturally assumed to increase with time, so that in the revised series, we desire a gradual increase in the level or revision over time which culminates in the real difference observed between the two independent sample estimates of the prior year. At the same time, we desire that the annual movement of the original series be preserved to the degree possible in the revised series (U.S. Bureau of the Census, 1994).*

To that end, the wedging algorithm does not change estimates from sample years and adjusts estimates from panel years, recognizing that deterioration of the panel is progressive over time. One of the primary reasons for deciding to select a new sample annually rather than at irregular intervals was to avoid applying global revision processes such as wedging. Consequently, the 1992 survey was intended to be the last one affected by the wedging procedure.

Federal Funds for Research and Development—and from performers of the work—industry, Federal labs, universities, and other nonprofit organizations—using the Survey of Industrial Research and Development and other surveys. As reported by Federal agencies, NSF publishes data on Federal R&D budget authority and outlays, in addition to Federal obligations. These terms are defined below:[17]

- *Budget authority* is the primary source of legal authorization to enter into financial obligations that will result in outlays. Budget authority most commonly is granted in the form of appropriations laws enacted by Congress with the approval of the president (NSF 2001b).

- *Obligations* represent the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated or when future payment of money is required.

- *Outlays* represent the amounts for checks issued and cash payments made during a given period, regardless of when the funds were appropriated or obligated.

National R&D expenditure totals in NSF's *National Patterns of R&D Resources* report series are primarily constructed with data reported by performers and include estimates of Federal R&D funding to these sectors. But until performer-reported survey data on Federal R&D expenditures are available from industry and academia, data collected from the Federal agency funders of R&D were used to project R&D performance. When survey data from the performers subsequently are tabulated, as they were for this report, these statistics replace the projections based on funder expectations. Historically, the two survey systems have tracked fairly closely. For example, in 1980, performers reported using $29.5 billion in Federal R&D funding, and Federal agencies reported total R&D funding between $29.2 billion in outlays and $29.8 billion in obligations (NSF 1996b). In recent years, however, the two series have diverged considerably. The difference in the Federal R&D totals appears to be concentrated in funding of industry, primarily aircraft and missile firms, by the Department of Defense. Overall, industrial firms have reported significant declines in Federal R&D support since 1990 (see table A-1), while Federal agencies have reported level or slightly increased funding of industrial R&D (NSF 1999a). NSF is identifying and examining the factors behind these divergent trends.

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[17] See also NSF (2000a).

Table B-1. **Survey of Industrial Research and Development---number of companies in the target population and selected for the sample, by industry and by size of company: 1999**

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Industry and size of company	NAICS codes	Companies in target population	1999 survey			Companies with reported or imputed R&D expenditures for 1999[3,4]		Companies that reported no R&D expenditures for 1999[4]
			Companies selected for 1999 sample	Non-certainties[1]	Certainties[2]	Greater than or equal to $5 million	Less than $5 million	
Distribution by industry:								
All industries	21-23, 31-33, 42, 44-81	1,854,218	24,431	21,791	2,640	1,808	1,863	16,612
Manufacturing	31-33	181,085	4,933	3,573	1,360	973	1,009	2,225
Food	311	2,500	166	106	60	35	55	56
Beverage and tobacco products	312	267	13	8	5	3	3	6
Textiles, apparel, and leather	313-16	3,428	226	156	70	13	66	104
Wood products	321	1,702	296	265	31	3	35	217
Paper, printing and support activities	322, 323	3,552	138	97	41	31	22	72
Petroleum and coal products	324	152	22	10	12	8	4	7
Chemicals	325	1,388	300	108	192	144	84	36
Basic chemicals	3251	227	155	65	90	46	55	29
Resin, synthetic rubber, fibers, and filament	3252	107	16	2	14	14	0	0
Pharmaceuticals and medicines	3254	300	53	6	47	45	4	1
Other chemicals	325 (minus 3251-52, 3254)	754	76	35	41	39	25	6
Plastics and rubber products	326	2,737	337	235	102	52	109	113
Nonmetallic mineral products	327	1,268	49	31	18	11	15	17
Primary metals	331	1,109	104	65	39	22	32	38
Fabricated metal products	332	5,853	358	257	101	36	134	140
Machinery	333	3,702	338	223	115	114	105	78
Computer and electronic products	334	2,749	427	125	302	300	53	31
Computers and peripheral equipment	3341	249	63	24	39	42	9	3
Communications equipment	3342	413	84	23	61	59	7	4
Semiconductor and other electronic components	3344	1,193	137	44	93	95	15	15
Navigational, measuring, electromedical, and control instruments	3345	736	115	20	95	93	13	5
Other computer and electronic products	334 (minus 3341-42, 3344-45)	158	28	14	14	11	9	4

See explanatory information and SOURCE at end of table.

Table B-1. **Survey of Industrial Research and Development---number of companies in the target population and selected for the sample, by industry and by size of company: 1999**

Page 2 of 4

Industry and size of company	NAICS codes	Companies in target population	1999 survey			Companies with reported or imputed R&D expenditures for 1999 [3,4]		Companies that reported no R&D expenditures for 1999 [4]
			Companies selected for 1999 sample	Non-certainties [1]	Certainties [2]	Greater than or equal to $5 million	Less than $5 million	
Distribution by industry:								
Electrical equipment, appliances, and components	335	1,049	161	102	59	53	50	31
Transportation equipment	336	2,054	145	64	81	77	17	35
Motor vehicles, trailers, and parts	3361-63	1,400	64	29	35	37	4	16
Aerospace products and parts	3364	269	29	5	24	24	0	4
Other transportation equipment	336 (minus 3361-64)	385	52	30	22	16	13	15
Furniture and related products	337	1,570	93	58	35	10	31	43
Miscellaneous manufacturing	339	1,969	317	222	95	59	101	112
Medical equipment and supplies	3391	589	118	70	48	43	34	22
Other miscellaneous manufacturing	339 (minus 3391)	1,380	199	152	47	16	67	90
Other manufacturing [5]	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--
Small manufacturing companies [6]	Fewer than 50 employees	144,036	1,443	1,441	2	2	93	1,090
Nonmanufacturing	21-23, 42, 44-81	1,673,133	19,498	18,218	1,280	835	854	14,387
Mining, extraction, and support activities	21	3,241	85	70	15	13	8	52
Utilities	22	571	66	34	32	9	32	18
Construction	23	73,991	1,493	1,486	7	6	13	1,263
Trade	42, 44, 45	146,369	3,062	2,953	109	98	58	2,474
Transportation and warehousing	48, 49	21,380	456	439	17	3	12	364
Information	51	12,029	674	470	204	189	100	267
Publishing	511	5,321	410	268	142	155	83	103
Newspaper, periodical, book, and database	5111	3,324	81	73	8	6	4	59
Software	5112	1,997	329	195	134	149	79	44
Broadcasting and telecommunications	513	3,524	132	99	33	15	4	84

See explanatory information and SOURCE at end of table.

Table B-1. **Survey of Industrial Research and Development---number of companies in the target population and selected for the sample, by industry and by size of company: 1999**

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Industry and size of company	NAICS codes	Companies in target population	1999 survey			Companies with reported or imputed R&D expenditures for 1999 [3 4]		Companies that reported no R&D expenditures for 1999 [4]
			Companies selected for 1999 sample	Non-certainties [1]	Certainties [2]	Greater than or equal to $5 million	Less than $5 million	
Distribution by industry								
Radio and television broadcasting	5131	1,723	37	35	2	2	1	26
Telecommunications	5133	1,465	42	30	12	11	1	21
Other broadcasting and telecommunications	513 (minus 5131, 5133)	336	53	34	19	2	2	37
Other information	51 (minus 511, 513)	3,184	132	103	29	19	13	80
Finance, insurance, and real estate	52, 53	38,021	863	810	53	33	15	693
Professional, scientific, and technical services	54	49,843	3,464	2,734	730	456	510	1,900
Architectural, engineering, and related services	5413	11,182	906	719	187	68	96	634
Computer systems design and related services	5415	6,243	1,297	1,026	271	114	279	583
Scientific R&D services	5417	1,402	519	286	233	262	113	71
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	31,016	742	703	39	12	22	612
Management of companies and enterprises	55	571	106	75	31	3	6	72
Health care services	621-23	43,379	894	885	9	2	11	746
Other nonmanufacturing	56, 61, 624, 71, 72, 81	180,093	3,877	3,811	66	18	50	2,979
Small nonmanufacturing companies [6]	Fewer than 15 employees	1,103,645	4,458	4,451	7	5	39	3,560

See explanatory information and SOURCE at end of table.

Table B-1 **Survey of Industrial Research and Development—number of companies in the target population and selected for the sample, by industry and by size of company: 1999**

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Industry and size of company		Companies in target population	1999 survey			Companies with reported or imputed R&D expenditures for 1999 [3,4]		Companies that reported no R&D expenditures for 1999 [4]
			Companies selected for 1999 sample	Non-certainties [1]	Certainties [2]	Greater than or equal to $5 million	Less than $5 million	
Distribution by size of company: [Number of employees]								
Total		1,854,218	24,431	21,791	2,640	1,808	1,863	16,612
5 to 24		1,462,627	10,725	10,681	44	9	249	NA
25 to 49		212,837	4,490	4,437	53	45	244	NA
50 to 99		99,234	2,882	2,759	123	134	267	NA
100 to 249		52,087	2,341	2,054	287	243	328	NA
250 to 499		14,334	1,022	705	317	210	206	NA
500 to 999		6,422	847	450	397	226	218	NA
1,000 to 4,999		5,140	1,287	487	800	487	257	NA
5,000 to 9,999		757	362	94	268	212	44	NA
10,000 to 24,999		481	263	55	208	139	40	NA
25,000 or more		299	212	69	143	103	9	NA

[1] Noncertainties are companies whose probability of selection is less than one.

[2] Certainties are companies whose probability of selection is one. This includes companies whose 1998 R&D expenditures were equal to or greater than $5 million.

[3] Includes RD-1 companies for which total R&D expenditure data were imputed.

[4] Does not include companies that did not respond to the survey or that did not indicate any information about R&D performance on a returned questionnaire. Also excludes companies that reported they were out-of-scope, out-of-business, or had merged with another company.

[5] "Other manufacturing" is intentionally left blank to allow for possible future North American Industry Classification System (NAICS) expansion.

[6] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: -- = Indicates data not collected.
NA = Not available.

NOTE: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table B-2 **Survey of Industrial Research and Development—relative standard error for survey estimates, by industry and by size of company: 1999**

Page 1 of 4

Industry and size of company	NAICS codes	Number of R&D-performing companies	Domestic net sales of R&D performers	Domestic employment of R&D performers	Number of FTE scientists and engineers	Total R&D	Company and other funds for R&D	Company-financed R&D performed outside of U.S.	Company-financed R&D contracted to outside organizations	Federal funds for R&D	Total funds for basic research	Total funds for applied research	Total funds for development
			[Percent]										
Distribution by industry:													
All industries	21-23, 31-33, 42, 44-81	3,671	16.2	20.9	2.2	2.4	2.7	0.4	12.1	1.5	3.6	1.8	4.2
Manufacturing	31-33	1,982	2.6	1.8	2.4	2.1	2.4	0.4	2.8	0.9	2.2	1.3	3.8
Food	311	90	3.3	6.4	4.4	2.2	2.2	0.0	20.8	0.0	17.4	3.5	2.3
Beverage and tobacco products	312	6	1.6	2.1	1.7	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.8
Textiles, apparel, and leather	313-16	79	8.1	8.2	73.8	3.9	3.9	0.1	45.9	0.0	17.0	9.3	4.4
Wood products	321	38	10.2	9.1	8.7	8.3	8.3	0.0	6.4	34.8	6.6	11.7	14.2
Paper, printing and support activities	322, 323	53	4.5	4.8	1.7	0.9	0.9	0.0	0.7	0.0	7.1	1.1	2.5
Petroleum and coal products	324	12	0.7	3.4	19.4	4.9	4.9	0.0	0.0	0.0	24.6	6.1	3.3
Chemicals	325	228	2.2	4.3	1.7	0.8	0.8	0.3	0.3	0.1	0.4	0.9	1.2
Basic chemicals	3251	101	4.5	12.8	0.5	0.5	0.5	0.9	10.9	0.2	0.4	0.4	1.5
Resin, synthetic rubber, fibers, and filament	3252	14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pharmaceuticals and medicines	3254	49	2.0	4.6	2.6	1.2	1.2	0.4	0.0	0.0	0.0	0.0	1.6
Other chemicals	325 (minus 3251-52, 3254)	64	6.4	7.6	5.0	2.7	2.8	3.3	12.2	0.0	7.0	5.6	3.1
Plastics and rubber products	326	161	7.2	5.8	12.0	9.3	9.3	3.9	4.8	0.0	13.9	23.0	8.4
Nonmetallic mineral products	327	26	22.4	32.2	3.1	2.9	2.9	0.0	75.9	0.0	3.4	4.4	3.4
Primary metals	331	54	6.2	6.7	3.9	4.1	4.1	10.4	1.3	5.8	3.2	7.3	9.4
Fabricated metal products	332	170	3.9	4.1	6.1	3.3	2.9	0.5	29.2	48.1	10.0	9.0	5.9
Machinery	333	219	6.0	9.0	9.4	2.7	2.8	1.1	5.1	12.2	16.9	4.8	3.6
Computer and electronic products	334	353	2.0	2.8	1.5	1.1	1.2	0.3	7.8	2.0	10.9	2.2	2.1
Computers and peripheral equipment	3341	51	1.8	3.5	4.5	2.5	2.5	0.0	18.2	0.0	6.2	0.6	7.2
Communications equipment	3342	66	3.0	5.4	3.5	3.5	3.6	0.1	0.0	0.0	23.4	20.1	7.7
Semiconductor and other electronic components	3344	110	2.9	6.6	2.4	1.6	1.5	1.5	19.0	66.1	4.2	2.6	2.8
Navigational, measuring, electromedical, and control instruments	3345	106	2.4	3.4	1.2	1.0	1.1	0.2	16.2	1.9	2.6	5.3	3.0
Other computer and electronic products	334 (minus 3341-42, 3344-45)	20	40.4	37.9	36.6	26.0	26.0	0.0	0.0	0.0	82.5	21.2	15.0

See explanatory information and SOURCE at end of table.

Table B-2. **Survey of Industrial Research and Development—relative standard error for survey**

Industry and size of company	NAICS codes	Number of R&D-performing companies	Domestic net sales of R&D performers	Domest employm of R&D performe
Distribution by industry:				
Electrical equipment, appliances, and components	335	103	2.1	
Transportation equipment	336	94	9.5	
Motor vehicles, trailers, and parts	3361-63	41	12.7	
Aerospace products and parts	3364	24	0.0	
Other transportation equipment	336 (minus 3361-64)	29	3.9	
Furniture and related products	337	41	6.6	
Miscellaneous manufacturing	339	160	2.8	
Medical equipment and supplies	3391	77	2.3	
Other miscellaneous manufacturing	339 (minus 3391)	83	6.3	
Other manufacturing [1]	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	
Small manufacturing companies [2]	Fewer than 50 employees	95	13.6	
Nonmanufacturing	21-23, 42, 44-81	1,689	34.7	
Mining, extraction, and support activities	21	21	37.1	
Utilities	22	41	6.8	
Construction	23	19	26.4	
Trade	42, 44, 45	156	10.6	
Transportation and warehousing	48, 49	15	21.4	
Information	51	289	16.4	
Publishing	511	238	3.2	
Newspaper, periodical, book, and database	5111	10	7.7	
Software	5112	228	3.5	
Broadcasting and telecommunications	513	19	22.0	

See explanatory information and SOURCE at end of table.

stimates, by industry and by size of company: 1999

t	Number of FTE scientists and engineers	Total R&D	Company and other funds for R&D	Company-financed R&D performed outside of U.S.	Company-financed R&D contracted to outside organizations	Federal funds for R&D	Total funds for basic research	Total funds for applied research	Total funds for development
				[Percent]					
6	6.2	1.4	1.5	9.4	2.1	2.5	7.8	2.2	1.6
7	5.9	5.5	7.8	0.1	0.1	0.6	2.3	3.5	8.6
4	10.8	10.2	10.3	0.0	0.1	0.7	11.8	5.7	16.4
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	5.9	5.2	6.3	21.9	14.3	8.0	30.4	12.8	2.2
0	7.2	6.4	6.4	0.0	87.3	0.0	38.4	23.0	5.4
9	4.4	2.1	2.0	0.8	29.4	62.5	20.5	10.5	2.2
4	5.4	2.3	2.2	0.9	16.9	63.0	28.0	15.1	2.3
1	7.0	4.6	4.6	0.5	52.3	0.0	27.9	6.0	5.7
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8	22.7	48.2	49.2	99.5	62.4	58.5	24.0	26.9	59.4
8	3.9	5.6	6.0	1.1	21.5	5.4	7.9	4.5	8.2
0	38.5	73.8	73.8	76.9	0.0	0.0	0.0	34.3	80.5
5	10.7	10.5	11.6	0.0	7.2	11.1	5.9	44.3	5.2
6	52.6	53.3	53.4	0.0	0.0	0.0	40.1	17.7	61.7
1	9.6	7.2	7.2	0.3	4.2	26.8	13.6	13.9	8.1
1	39.6	18.4	18.4	0.0	20.2	0.0	9.2	80.6	47.7
6	4.1	3.3	3.5	0.3	7.6	3.6	33.4	5.0	2.8
5	2.9	2.2	2.2	0.7	19.9	26.8	10.3	7.1	3.3
6	36.4	26.4	26.4	0.0	0.0	0.0	0.0	70.0	23.4
5	2.5	2.1	2.1	0.7	20.1	26.8	10.5	6.4	3.3
5	11.3	16.5	21.5	0.0	0.0	2.9	3.0	0.7	0.3

Table B-2. **Survey of Industrial Research and Development—relative standard error for survey estimates, by industry and by size of company: 1999**

Industry and size of company	NAICS codes	Number of R&D-performing companies	Domestic net sales of R&D performers	Domestic employment of R&D performers	Number of FTE scientists and engineers	Total R&D	Company and other funds for R&D	Company-financed R&D performed outside of U.S.	Company-financed R&D contracted to outside organizations	Federal funds for R&D	Total funds for basic research	Total funds for applied research	Total funds for development
			[Percent]										
Distribution by industry:													
Radio and television broadcasting	5131	3	0.5	3.6	1.0	0.4	1.3	0.0	0.0	0.0	24.3	0.0	0.0
Telecommunications	5133	12	22.6	23.6	17.3	20.5	23.5	0.0	0.0	0.0	0.0	0.0	0.0
Other broadcasting and telecommunications	513 (minus 5131, 5133)	4	40.3	50.0	41.2	41.0	21.9	0.0	92.1	94.4	92.1	62.9	17.7
Other information	51 (minus 511, 513)	32	7.3	5.1	19.8	14.7	14.9	0.0	16.2	0.0	94.1	9.2	7.5
Finance, insurance, and real estate	52, 53	48	10.4	13.7	6.3	9.9	9.9	0.0	26.5	0.0	11.1	2.9	10.7
Professional, scientific, and technical services	54	966	4.0	2.7	2.7	4.8	6.1	5.6	5.8	4.9	5.7	4.6	9.1
Architectural, engineering, and related services	5413	164	11.8	7.2	6.1	23.1	33.7	0.7	48.4	12.0	28.9	21.2	42.6
Computer systems design and related services	5415	393	4.0	2.5	3.7	4.0	3.9	10.5	20.3	20.7	13.9	6.6	4.7
Scientific R&D services	5417	375	3.6	2.3	2.7	2.5	2.6	8.8	5.9	5.2	5.8	4.3	3.4
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	34	6.7	7.3	29.5	41.6	43.2	0.0	0.0	0.0	31.8	67.1	39.8
Management of companies and enterprises	55	9	20.1	27.6	54.3	68.2	68.9	25.8	0.0	0.0	42.4	0.0	83.2
Health care services	621-23	13	4.4	8.3	16.7	7.7	7.8	0.0	0.0	21.5	71.1	44.5	78.5
Other nonmanufacturing	56, 61, 624, 71, 72, 81	68	93.6	85.9	8.5	17.6	17.9	2.1	17.0	0.0	74.6	32.7	9.4
Small nonmanufacturing companies [2]	Fewer than 15 employees	44	56.2	54.9	26.9	51.1	53.3	0.0	99.0	83.1	49.5	60.5	55.8

See explanatory information and SOURCE at end of table.

Table B-2. **Survey of Industrial Research and Development---relative standard error for survey estimates, by industry and by size of company: 1999**

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Industry and size of company		Number of R&D-performing companies	Domestic net sales of R&D performers	Domestic employment of R&D performers	Number of FTE scientists and engineers	Total R&D	Company and other funds for R&D	Company-financed R&D performed outside of U.S.	Company-financed R&D contracted to outside organizations	Federal funds for R&D	Total funds for basic research	Total funds for applied research	Total funds for development
			[Percent]										
Distribution by size of company: [Number of employees]													
Total		3,671	16.2	20.9	2.2	2.4	2.7	0.4	12.1	1.5	3.6	1.8	4.2
5 to 24		258	13.4	9.5	15.6	37.5	40.9	32.7	90.7	34.5	21.7	24.0	46.8
25 to 49		289	12.6	10.0	13.8	18.6	19.9	49.9	24.1	24.7	16.6	16.5	28.3
50 to 99		401	10.9	9.8	21.2	22.4	24.4	27.5	34.8	23.8	14.1	14.8	31.5
100 to 249		571	9.1	8.3	6.6	6.5	6.8	11.4	26.3	20.8	12.3	15.0	7.2
250 to 499		416	19.6	20.3	10.1	22.5	24.0	23.4	10.7	6.2	32.6	7.6	32.1
500 to 999		444	11.4	10.4	8.6	4.5	4.8	0.7	7.7	10.0	11.8	5.8	4.8
1,000 to 4,999		744	13.5	10.2	9.1	9.3	9.6	0.3	7.5	12.1	1.3	4.0	12.6
5,000 to 9,999		256	3.1	5.0	0.3	0.1	0.1	0.0	1.5	0.1	0.2	0.5	0.1
10,000 to 24,999		179	2.0	5.5	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2
25,000 or more		112	0.9	9.0	0.5	0.4	0.5	0.1	0.0	0.0	4.9	0.0	0.1

[1] "Other manufacturing" is intentionally left blank to allow for possible future North American Industry Classification System (NAICS) expansion.

[2] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: -- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

A description of the standard error of estimate is given in section A under "Survey Methodology". The percentage (or relative) standard errors in this table may be converted to standard errors of estimate by multiplying the percentages shown by the associated estimates. For example, the relative standard error of estimate for company-funded R&D performance by the wood products industry (NAICS 321) is shown as 8.3 percent, and the associated company-funded R&D estimate for this industry is shown as $70 million in Table A-7. The standard error of estimate is 0.083 times 70 or 5.8.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table B-3. **Survey of Industrial Research and Development---relative standard error for estimates of total R&D and percentage of estimates attributed to certainty companies, by state: 1999**

Page 1 of 2

State	Total R&D	Relative standard errors	Percent of estimate from certainties
United States, total	182,823	2.4	81.9
Alabama	556	6.3	82.9
Alaska	(D)	NA	100.0
Arizona	4,434	56.4	37.3
Arkansas	216	10.3	77.7
California	39,047	3.9	78.9
Colorado	3,136	8.8	83.0
Connecticut	(S) 3,984	2.1	90.6
Delaware	(S) 1,261	1.6	96.6
District of Columbia	171	39.4	50.1
Florida	(S) 2,697	2.3	91.0
Georgia	1,827	13.5	63.5
Hawaii	27	11.3	72.4
Idaho	1,210	3.6	94.8
Illinois	7,715	5.4	85.2
Indiana	(S) 2,246	2.4	92.5
Iowa	559	4.3	90.8
Kansas	(S) 1,284	2.0	95.4
Kentucky	684	23.9	61.5
Louisiana	187	12.6	82.5
Maine	140	0.1	99.8
Maryland	1,700	8.7	72.3
Massachusetts	9,314	1.8	87.2
Michigan	17,714	9.4	87.0
Minnesota	3,379	2.5	90.0
Mississippi	114	12.7	76.3
Missouri	(S) 1,387	6.9	85.0
Montana	33	2.3	96.5
Nebraska	178	39.0	25.2
Nevada	337	4.1	95.4
New Hampshire	1,099	5.3	87.2
New Jersey	9,453	1.1	94.1
New Mexico	(S) 1,342	6.0	89.5
New York	11,388	2.0	89.5
North Carolina	3,953	20.4	75.5
North Dakota	75	44.5	32.2
Ohio	6,514	12.1	79.0
Oklahoma	365	19.1	67.9
Oregon	1,540	17.2	64.4
Pennsylvania	8,932	17.1	68.6
Rhode Island	(S) 1,264	1.4	95.5

See explanatory information and SOURCE at end of table.

Table B-3. **Survey of Industrial Research and Development---relative standard error for estimates of total R&D and percentage of estimates attributed to certainty companies, by state: 1999**

Page 2 of 2

State	Total R&D	Relative standard errors	Percent of estimate from certainties
South Carolina	665	1.6	96.0
South Dakota	13	24.0	74.4
Tennessee	1,768	1.7	94.9
Texas	9,935	18.5	63.8
Utah	1,123	20.9	65.9
Vermont	318	4.5	95.1
Virginia	2,488	9.9	66.1
Washington	(S) 7,231	3.3	88.3
West Virginia	(S) 216	3.4	95.1
Wisconsin	1,949	5.0	77.3
Wyoming	(D)	NA	100.0
Undistributed funds	(S) 5,649	NA	100.0

KEY: (D) = Data have been withheld to avoid disclosing operations of individual companies.
(S) = Indicates imputation of more than 50 percent.
NA = Not applicable.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table B-4. **Survey of Industrial Research and Development--unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and by type of survey form: 1999**

Page 1 of 8

Industry and form received	NAICS codes	Number of companies that received a questionnaire	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
All industries	21-23, 31-33, 42, 44-81	24,219	20,149	83.2	16.9
Manufacturing	31-33	4,902	4,076	83.2	44.7
Food	311	165	140	84.9	60.0
Beverage and tobacco products	312	13	12	92.3	50.0
Textiles, apparel, and leather	313-16	223	180	80.7	41.7
Wood products	321	293	256	87.4	15.2
Paper, printing and support activities	322, 323	138	120	87.0	40.0
Petroleum and coal products	324	22	19	86.4	68.4
Chemicals	325	298	250	83.9	84.0
Basic chemicals	3251	153	126	82.4	75.4
Resin, synthetic rubber, fibers, and filament	3252	16	14	87.5	100.0
Pharmaceuticals and medicines	3254	53	43	81.1	97.7
Other chemicals	325 (minus 3251-52, 3254)	76	67	88.2	88.1
Plastics and rubber products	326	337	273	80.8	57.1
Nonmetallic mineral products	327	49	43	87.8	62.8
Primary metals	331	104	91	87.5	56.0
Fabricated metal products	332	358	307	86.0	53.8
Machinery	333	336	281	83.6	70.1
Computer and electronic products	334	426	321	75.4	89.7
Computers and peripheral equipment	3341	62	46	75.4	91.3
Communications equipment	3342	84	51	60.7	94.1
Semiconductor and other electronic components	3344	137	111	80.4	86.5
Navigational, measuring, electromedical, and control instruments	3345	115	93	80.9	93.6
Other computer and electronic products	334 (minus 3341-42, 3344-45)	28	20	71.4	75.0
Electrical equipment, appliances, and components	335	158	128	81.0	74.2
Transportation equipment	336	142	116	81.7	70.7
Motor vehicles, trailers, and parts	3361-63	64	53	82.8	69.8
Aerospace products and parts	3364	28	20	71.4	80.0
Other transportation equipment	336 (minus 3361-64)	50	43	86.0	67.4

See explanatory information and SOURCE at end of table.

Table B-4. **Survey of Industrial Research and Development--unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and by type of survey form: 1999**

Industry and form received	NAICS codes	Number of companies that received a questionnaire	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
Furniture and related products	337	93	86	92.5	48.8
Miscellaneous manufacturing	339	313	262	83.7	56.5
Medical equipment and supplies	3391	116	92	79.3	75.0
Other miscellaneous manufacturing	339 (minus 3391)	197	170	86.3	46.5
Other manufacturing [1]	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--
Small manufacturing companies [2]	Fewer than 50 employees	1,434	1,191	83.1	7.9
Nonmanufacturing	21-23, 42, 44-81	19,317	16,073	83.2	9.8
Mining, extraction, and support activities	21	85	73	85.9	28.8
Utilities	22	64	57	89.1	70.2
Construction	23	1,493	1,294	86.7	1.4
Trade	42, 44, 45	3,059	2,636	86.2	5.0
Transportation and warehousing	48, 49	455	381	83.7	3.9
Information	51	670	528	82.1	35.4
Publishing	511	406	315	77.6	67.0
Newspaper, periodical, book, and database	5111	81	67	82.7	13.4
Software	5112	325	248	76.3	81.5
Broadcasting and telecommunications	513	132	103	78.0	19.4
Radio and television broadcasting	5131	37	31	81.6	12.9
Telecommunications	5133	42	31	73.8	35.5
Other broadcasting and telecommunications	513 (minus 5131, 5133)	53	41	78.9	12.2
Other information	51 (minus 511, 513)	132	110	83.3	26.4
Finance, insurance, and real estate	52, 53	860	737	85.7	5.6
Professional, scientific, and technical services	54	3,433	2,841	82.8	32.4

See explanatory information and SOURCE at end of table.

Table B-4. **Survey of Industrial Research and Development--unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and by type of survey form: 1999**

Industry and form received	NAICS codes	Number of companies that received a questionnaire	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
Architectural, engineering, and related services	5413	904	791	87.5	19.0
Computer systems design and related services	5415	1,276	976	76.5	39.0
Scientific R&D services	5417	515	429	83.3	83.2
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	738	645	87.4	5.1
Management of companies and enterprises	55	99	82	82.8	12.2
Health care services	621-23	890	763	85.7	1.8
Other nonmanufacturing	56, 61, 624, 71, 72, 81	3,816	3,061	80.2	2.0
Small nonmanufacturing companies [2]	Fewer than 15 employees	4,393	3,620	82.4	1.2
Companies that received Form RD-1					
All industries	21-23, 31-33, 42, 44-81	1,602	1,293	80.7	97.1
Manufacturing	31-33	946	774	81.8	97.7
Food	311	33	27	81.8	96.3
Beverage and tobacco products	312	3	3	100.0	100.0
Textiles, apparel, and leather	313-16	15	11	73.3	100.0
Wood products	321	4	4	100.0	100.0
Paper, printing and support activities	322, 323	32	27	84.4	96.3
Petroleum and coal products	324	11	9	81.8	100.0
Chemicals	325	140	123	87.9	97.6
Basic chemicals	3251	39	34	87.2	97.1
Resin, synthetic rubber, fibers, and filament	3252	14	14	100.0	92.9
Pharmaceuticals and medicines	3254	47	39	83.0	100.0
Other chemicals	325 (minus 3251-52, 3254)	40	36	90.0	97.2
Plastics and rubber products	326	46	40	87.0	100.0
Nonmetallic mineral products	327	12	12	100.0	91.7
Primary metals	331	21	18	85.7	100.0
Fabricated metal products	332	38	33	86.8	100.0
Machinery	333	110	91	82.7	94.5

See explanatory information and SOURCE at end of table.

Table B-4. **Survey of Industrial Research and Development–unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and by type of survey form: 1999**

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Industry and form received	NAICS codes	Number of companies that received a questionnaire	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
Computer and electronic products	334	294	226	76.9	97.4
Computers and peripheral equipment	3341	36	28	77.8	96.4
Communications equipment	3342	61	38	62.3	97.4
Semiconductor and other electronic components	3344	93	79	85.0	98.7
Navigational, measuring, electromedical, and control instruments	3345	94	76	80.9	97.4
Other computer and electronic products	334 (minus 3341-42, 3344-45)	10	5	50.0	80.0
Electrical equipment, appliances, and components	335	49	40	81.6	100.0
Transportation equipment	336	69	55	79.7	100.0
Motor vehicles, trailers, and parts	3361-63	35	29	82.9	100.0
Aerospace products and parts	3364	23	16	69.6	100.0
Other transportation equipment	336 (minus 3361-64)	11	10	90.9	100.0
Furniture and related products	337	11	11	100.0	100.0
Miscellaneous manufacturing	339	56	43	76.8	97.7
Medical equipment and supplies	3391	41	32	78.1	96.9
Other miscellaneous manufacturing	339 (minus 3391)	15	11	73.3	100.0
Other manufacturing [1]	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--
Small manufacturing companies [2]	Fewer than 50 employees	2	1	50.0	100.0
Nonmanufacturing	21-23, 42, 44-81	656	519	79.1	96.3
Mining, extraction, and support activities	21	14	14	100.0	92.9
Utilities	22	14	12	85.7	100.0
Construction	23	5	4	80.0	100.0
Trade	42, 44, 45	107	80	74.8	97.5
Transportation and warehousing	48, 49	4	4	100.0	75.0
Information	51	153	115	80.2	97.7
Publishing	511	119	89	74.8	97.8
Newspaper, periodical, book, and database	5111	7	4	57.1	100.0
Software	5112	112	85	75.9	97.7

See explanatory information and SOURCE at end of table.

Table B-4. **Survey of Industrial Research and Development–unit response rates-nu
to the survey and percentage of companies that performed R&D, by industry and by**

Industry and form received	NAICS codes
Broadcasting and telecommunications	513
Radio and television broadcasting	5131
Telecommunications	5133
Other broadcasting and telecommunications	513 (minus 5131, 5133)
Other information	51 (minus 511, 513)
Finance, insurance, and real estate	52, 53
Professional, scientific, and technical services	54
Architectural, engineering, and related services	5413
Computer systems design and related services	5415
Scientific R&D services	5417
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)
Management of companies and enterprises	55
Health care services	621-23
Other nonmanufacturing	56, 61, 624, 71, 72, 81
Small nonmanufacturing companies [2]	Fewer than 15 employees
Companies that received Form RD-1A	
All industries	21-23, 31-33, 42, 44-81
Manufacturing	31-33
Food	311
Beverage and tobacco products	312
Textiles, apparel, and leather	313 16
Wood products	321
Paper, printing and support activities	322, 323
Petroleum and coal products	324
Chemicals	325

See explanatory information and SOURCE at end of table.

umber and percentage of companies that responded y type of survey form: 1999

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	Number of companies that received a questionnaire	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
3	14	11	78.6	100.0
1	2	2	100.0	100.0
3	12	9	75.0	100.0
)	0	--	--	--
)	20	15	75.0	86.7
3	35	27	77.1	96.3
4	297	245	82.5	97.6
3	59	44	74.6	90.9
5	60	47	78.3	97.9
7	167	144	86.2	100.0
)	11	10	90.9	90.0
5	0	--	--	--
3	2	2	100.0	100.0
1	20	14	70.0	71.4
s	5	2	40.0	100.0
1	22,617	18,856	83.4	11.3
3	3,956	3,302	83.5	32.2
1	132	113	85.6	51.3
2	10	9	90.0	33.3
6	208	169	81.3	37.9
1	289	252	87.2	13.9
3	106	93	87.7	23.7
4	11	10	90.9	40.0
5	158	127	80.4	70.9

Table B-4. **Survey of Industrial Research and Development--unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and by type of survey form: 1999**

Industry and form received	NAICS codes	Number of companies that received a questionnaire	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
Companies that received Form RD-1A					
Resin, synthetic rubber, fibers, and filament	3252	2	0	0.0	0.0
Pharmaceuticals and medicines	3254	6	4	66.7	75.0
Other chemicals	325 (minus 3251-52, 3254)	36	31	86.1	77.4
Plastics and rubber products	326	292	233	79.8	49.8
Nonmetallic mineral products	327	37	31	83.8	51.6
Primary metals	331	83	73	88.0	45.2
Fabricated metal products	332	319	274	85.9	48.2
Machinery	333	226	190	84.1	58.4
Computer and electronic products	334	132	95	72.0	71.6
Computers and peripheral equipment	3341	25	18	72.0	83.3
Communications equipment	3342	23	13	56.5	84.6
Semiconductor and other electronic components	3344	45	32	71.1	56.3
Navigational, measuring, electromedical, and control instruments	3345	21	17	81.0	76.5
Other computer and electronic products	334 (minus 3341-42, 3344-45)	18	15	83.3	73.3
Electrical equipment, appliances, and components	335	109	88	80.7	62.5
Transportation equipment	336	73	61	83.6	44.3
Motor vehicles, trailers, and parts	3361-63	29	24	82.8	33.3
Aerospace products and parts	3364	5	4	80.0	0.0
Other transportation equipment	336 (minus 3361-64)	39	33	84.6	57.6
Furniture and related products	337	82	75	91.5	41.3
Miscellaneous manufacturing	339	257	219	85.2	48.4
Medical equipment and supplies	3391	75	60	80.0	63.3
Other miscellaneous manufacturing	339 (minus 3391)	182	159	87.4	42.8
Other manufacturing [1]	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--
Small manufacturing companies [2]	Fewer than 50 employees	1,432	1,190	83.1	7.8

See explanatory information and SOURCE at end of table.

Table B-4. **Survey of Industrial Research and Development--unit response rates-nu to the survey and percentage of companies that performed R&D, by industry and b**

Industry and form received	NAICS codes
Companies that received Form RD-1A	
Nonmanufacturing	21-23, 42, 44-81
Mining, extraction, and support activities	21
Utilities	22
Construction	23
Trade	42, 44, 45
Transportation and warehousing	48, 49
Information	51
Publishing	511
Newspaper, periodical, book, and database	5111
Software	5112
Broadcasting and telecommunications	513
Radio and television broadcasting	5131
Telecommunications	5133
Other broadcasting and telecommunications	513 (minus 5131, 5133
Other information	51 (minus 511, 513
Finance, insurance, and real estate	52, 53
Professional, scientific, and technical services	54

See explanatory information and SOURCE at end of table.

mber and percentage of companies that responded
y type of survey[a] form: 1999

Number of companies that received a questionnaire	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
18,661	15,554	83.4	6.9
71	59	83.1	13.6
50	45	90.0	62.2
1,488	1,290	86.7	1.1
2,952	2,556	86.6	2.1
451	377	83.6	3.2
517	413	82.3	28.0
287	226	78.8	54.9
74	63	85.1	7.9
213	163	76.5	73.0
118	92	78.0	9.8
36	29	80.6	6.9
30	22	73.3	9.1
52	41	78.9	12.2
112	95	84.8	16.8
825	710	86.1	2.1
3,136	2,596	82.8	26.3

Table B-4. **Survey of Industrial Research and Development--unit response rates-number and percentage of companies that responded to the survey and percentage of companies that performed R&D, by industry and by type of survey form: 1999**

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Industry and form received	NAICS codes	Number of companies that received a questionnaire	Number of companies that responded to the survey	Percentage of companies that responded to the survey	Percentage of responding companies that reported R&D
Companies that received Form RD-1A					
Architectural, engineering, and related services	5413	845	747	88.4	14.7
Computer systems design and related services	5415	1,216	929	76.4	36.1
Scientific R&D services	5417	348	285	81.9	74.7
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	727	635	87.4	3.8
Management of companies and enterprises	55	99	82	82.8	12.2
Health care services	621-23	888	761	85.7	1.6
Other nonmanufacturing	56, 61, 624, 71, 72, 81	3,796	3,047	80.3	1.7
Small nonmanufacturing companies [2]	Fewer than 15 employees	4,388	3,618	82.5	1.1

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[1] "Other manufacturing" is intentionally left blank to allow for possible future North American Industry Classification System (NAICS) expansion.

[2] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: -- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system.

The calculation of the "percentage of companies that responded to the survey"' was based on all companies that responded to the survey, including those that reported they were out of scope, out of business, or had merged with another company. It excludes companies for which total R&D expenditure data were imputed. Mathematically, the percentage was calculated by dividing the number of companies that received a questionnaire (indicated in the previous column) into the number of companies that returned a response or questionnaire regardless of the data or information supplied in the response or on the questionnaire.

The "number of companies that received a questionnaire" is less than the number of "companies selected for the sample" in Table B-1 because some companies selected for the survey went out of business or were merged with other companies during the time between sample selection and survey mailout.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table B-5. **Survey of Industrial Research and Development--imputation rates for survey items, by industry and by size of company: 1999**

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Industry and size of company	NAICS codes	Net sales	Total employment	R&D scientists/engineers	Total R&D			R&D costs by agency				R&D by type of cost				Company R&D		Energy R&D
					Total	Company	Federal	DoD	NASA	DOE	Other agencies	Wages	Materials	Depreciation	Other costs	Contracted out R&D	Foreign R&D	
		[Percent]																
Distribution by industry:																		
All industries	21-23, 31-33, 42, 44-81	8.6	6.9	32.2	6.6	6.0	11.3	70.3	63.7	38.3	48.4	50.7	54.7	9.2	59.8	7.4	5.3	4.5
Manufacturing	31-33	12.1	7.7	41.8	7.6	6.7	12.2	69.7	58.4	34.9	43.5	56.3	58.1	10.2	65.2	12.3	6.4	4.3
Food	311	12.0	11.5	37.5	13.3	13.3	0.0	0.0	0.0	0.0	0.0	58.6	61.4	18.2	56.4	0.0	0.0	0.0
Beverage and tobacco products	312	0.0	0.0	23.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Textiles, apparel, and leather	313-16	9.6	8.0	11.8	31.9	31.9	0.0	0.0	0.0	0.0	0.0	54.9	60.6	0.0	68.6	0.0	0.0	0.0
Wood products	321	0.0	0.0	22.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.2	13.4	0.0	18.8	0.0	0.0	0.0
Paper, printing and support activities	322, 323	14.8	17.7	54.5	32.4	31.1	99.5	0.0	0.0	99.5	99.5	65.6	55.3	2.7	44.2	0.0	2.8	0.0
Petroleum and coal products	324	0.0	0.0	25.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.8	20.6	0.0	15.6	0.0	0.0	0.0
Chemicals	325	9.4	8.3	39.4	8.5	8.0	20.1	93.2	100.0	91.9	93.8	56.5	62.3	12.4	61.2	14.1	15.9	0.0
Basic chemicals	3251	4.0	4.3	34.9	7.1	7.3	3.3	92.7	0.0	0.0	94.1	57.2	42.1	0.0	34.0	10.6	14.9	0.0
Resin, synthetic rubber, fibers, and filament	3252	1.9	9.9	21.7	5.4	0.0	38.1	100.0	100.0	100.0	0.0	31.8	36.2	3.2	34.1	19.1	0.0	0.0
Pharmaceuticals and medicines	3254	22.7	14.0	38.3	11.0	10.8	91.3	0.0	0.0	91.5	90.8	57.0	69.4	20.9	62.5	14.4	17.7	0.0
Other chemicals	325 (minus 3251-52, 3254)	4.6	5.0	53.5	1.5	2.9	0.0	93.4	0.0	0.0	93.4	73.1	71.0	7.9	85.9	0.2	0.1	0.0
Plastics and rubber products	326	8.2	8.7	43.8	3.9	3.9	0.0	0.0	0.0	0.0	0.0	69.9	75.1	19.7	67.4	0.0	1.0	0.0
Nonmetallic mineral products	327	0.0	0.0	49.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	39.5	24.5	8.9	47.9	0.0	0.0	0.0
Primary metals	331	3.1	3.4	67.4	6.2	6.3	0.0	0.0	0.0	0.0	0.0	33.1	27.3	9.1	54.5	6.3	0.0	0.0
Fabricated metal products	332	3.9	3.6	26.1	4.6	4.7	0.0	76.3	12.0	67.5	0.0	68.7	67.9	0.9	64.8	24.8	11.7	0.0
Machinery	333	5.5	6.7	29.9	24.7	10.5	81.2	94.5	99.2	80.7	98.8	32.8	33.3	15.1	40.3	0.6	2.4	54.6
Computer and electronic products	334	11.0	11.3	55.2	6.5	7.7	5.7	96.9	96.3	45.5	82.3	64.9	73.8	2.4	68.3	2.4	9.0	57.5
Computers and peripheral equipment	3341	9.8	14.6	44.4	13.0	12.9	98.5	0.0	0.0	0.0	0.0	45.4	87.8	1.8	42.7	9.7	6.0	0.0
Communications equipment	3342	18.2	13.0	69.5	6.3	6.6	8.5	45.5	99.8	0.0	0.0	82.7	86.0	7.5	89.4	0.0	29.9	100.0
Semiconductor and other electronic components	3344	10.2	9.6	57.8	2.5	2.7	0.0	44.7	0.0	45.5	27.9	64.9	66.2	1.2	70.4	0.2	5.4	0.0

See explanatory information and SOURCE at end of table.

Table B-5. **Survey of Industrial Research and Development–imputation rates for survey items, by industry and by size of company: 1999**

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Industry and size of company	NAICS codes	Net sales	Total employment	R&D scientists/ engineers	Total R&D			R&D costs by agency				R&D by type of cost				Company R&D		Energy R&D
					Total	Company	Federal	DoD	NASA	DOE	Other agencies	Wages	Materials	Depreciation	Other costs	Contracted out R&D	Foreign R&D	
		[Percent]																
Distribution by industry:																		
Navigational, measuring, electromedical, and control instruments	3345	9.0	10.5	49.2	7.2	10.5	5.6	97.3	85.0	0.0	85.5	60.9	57.4	4.7	66.9	0.0	7.1	0.0
Other computer and electronic products	334 (minus 3341-42, 3344-45)	13.1	13.8	29.7	16.5	26.0	0.0	0.0	0.0	0.0	100.0	34.9	51.4	0.0	45.1	0.0	0.0	0.0
Electrical equipment, appliances, and components	335	1.7	3.4	20.8	2.8	3.0	0.0	0.4	0.4	0.4	0.4	38.3	30.1	15.4	41.1	0.2	1.6	0.0
Transportation equipment	336	20.7	4.8	42.4	4.8	1.8	11.9	37.7	42.0	29.6	39.7	49.5	53.4	7.7	70.8	0.1	0.1	0.2
Motor vehicles, trailers, and parts	3361-63	24.9	1.6	31.4	0.3	0.3	3.1	5.6	5.6	5.7	5.6	49.4	63.6	0.0	93.9	0.0	0.1	0.0
Aerospace products and parts	3364	9.7	10.9	58.6	10.8	7.0	13.0	37.2	46.8	29.6	40.0	50.0	38.7	0.0	57.5	0.5	0.3	0.3
Other transportation equipment	336 (minus 3361-64)	0.2	0.5	34.5	0.9	2.0	0.0	48.1	100.0	0.0	100.0	43.0	37.4	92.3	58.9	0.0	0.0	0.0
Furniture and related products	337	0.0	0.0	48.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.0	21.4	0.0	29.8	0.0	0.0	0.0
Miscellaneous manufacturing	339	3.3	4.0	41.5	4.4	4.4	0.0	0.0	0.0	0.0	0.6	79.7	77.8	0.0	79.5	3.8	0.3	0.0
Medical equipment and supplies	3391	3.6	4.1	49.2	3.9	4.0	0.0	0.0	0.0	0.0	0.6	84.8	86.1	0.0	84.9	8.3	0.4	0.0
Other miscellaneous manufacturing	339 (minus 3391)	2.6	3.8	21.5	7.1	7.1	0.0	0.0	0.0	0.0	0.0	34.1	30.5	0.0	33.4	0.0	0.0	0.0
Other manufacturing [1]	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Small manufacturing companies [2]	Fewer than 50 employees	6.7	1.5	1.3	0.2	0.2	0.8	0.0	0.0	100.0	0.0	100.0	100.0	100.0	100.0	0.0	0.0	0.0
Nonmanufacturing	21-23, 42, 44-81	4.6	6.1	19.0	4.9	4.7	8.3	75.3	75.6	75.1	76.8	40.9	42.7	7.2	40.2	3.4	1.6	8.1
Mining, extraction, and support activities	21	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0	0.0	100.0	27.1	28.6	64.3	43.0	0.0	0.0	8.1
Utilities	22	6.8	7.7	20.6	5.8	6.5	0.0	0.0	0.0	0.0	0.0	42.1	43.2	0.0	43.6	7.7	0.0	0.0
Construction	23	3.8	4.2	4.2	3.4	3.4	0.0	69.6	69.6	0.0	0.0	6.0	6.2	0.0	13.0	0.0	0.0	0.0

See explanatory information and SOURCE at end of table.

Table B-5. **Survey of Industrial Research and Development--imputation rates for survey i**

Industry and size of company	NAICS codes	Net sales	Total employment	R&D scientists/ engineers	Total R&D Total	Company
Distribution by industry:						
Trade	42, 44, 45	9.0	16.4	15.6	3.1	2.9
Transportation and warehousing	48, 49	0.0	0.0	17.1	0.0	0.0
Information	51	4.7	5.7	26.1	8.4	7.1
Publishing	511	14.2	13.5	20.4	8.6	8.6
Newspaper, periodical, book, and database	5111	28.5	15.1	18.4	28.5	28.5
Software	5112	10.0	12.5	20.5	7.9	7.9
Broadcasting and telecommunications	513	2.5	4.1	70.9	15.1	3.3
Radio and television broadcasting	5131	83.4	89.5	91.5	77.6	27.8
Telecommunications	5133	0.2	0.2	63.2	1.3	1.5
Other broadcasting and telecommunications	513 (minus 5131, 5133)	0.0	0.0	0.0	0.0	0.0
Other information	51 (minus 511, 513)	0.7	0.5	12.6	1.9	2.0
Finance, insurance, and real estate	52, 53	9.2	17.1	24.9	5.9	5.9
Professional, scientific, and technical services	54	3.8	2.1	21.6	4.2	5.0
Architectural, engineering, and related services	5413	4.7	2.6	20.0	5.6	4.9
Computer systems design and related services	5415	5.0	3.5	17.0	5.7	6.2
Scientific R&D services	5417	5.3	1.6	25.2	3.1	4.6
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	0.2	0.2	27.7	5.8	2.6

See explanatory information and SOURCE at end of table.

tems, by industry and by size of company: 1999

)	R&D costs by agency				R&D by type of cost				Company R&D		
Federal	DoD	NASA	DOE	Other agencies	Wages	Materials	Depreciation	Other costs	Contracted out R&D	Foreign R&D	Energy R&D
				[Percent]							
33.2	69.8	69.7	0.0	69.7	33.7	40.8	4.6	24.1	1.4	0.2	0.0
0.0	0.0	0.0	0.0	0.0	68.7	68.7	0.0	68.7	0.0	0.0	0.0
47.4	88.8	84.1	0.0	80.8	50.5	49.3	16.5	54.6	0.8	0.5	0.0
17.1	76.8	49.2	0.0	49.2	57.0	42.9	10.2	59.0	2.3	1.0	0.0
0.0	0.0	0.0	0.0	0.0	55.4	24.8	0.0	65.1	44.4	0.0	0.0
17.1	76.8	49.2	0.0	49.2	57.0	44.3	10.4	58.9	1.8	1.0	0.0
53.7	100.0	100.0	0.0	100.0	79.2	87.6	43.1	70.2	0.0	0.0	0.0
99.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	100.0	100.0	0.0	100.0	79.2	87.6	43.1	70.2	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	3.4	1.3	12.3	4.4	0.0	0.0	0.0
0.0	0.0	0.0	0.0	0.0	56.7	19.6	0.0	42.1	11.9	58.9	0.0
2.4	73.3	75.5	75.1	71.7	37.8	47.0	6.0	42.3	3.1	3.8	0.0
7.1	72.7	74.4	74.3	71.8	57.5	67.6	3.1	73.9	2.9	2.2	0.0
0.0	20.7	0.0	0.0	0.0	26.0	27.7	43.5	29.2	0.0	10.1	0.0
0.3	75.4	79.3	75.3	76.1	37.3	41.8	3.5	37.8	3.4	1.2	0.0
86.0	100.0	0.0	0.0	100.0	23.1	74.2	0.0	26.7	0.0	0.0	0.0

Table B-5. **Survey of Industrial Research and Development--imputation rates for survey items, by industry and by size of company: 1999**

Page 4 of 4

Industry and size of company	NAICS codes	Net sales	Total employment	R&D scientists/ engineers	Total R&D			R&D costs by agency				R&D by type of cost				Company R&D		Energy R&D
					Total	Company	Federal	DoD	NASA	DOE	Other agencies	Wages	Materials	Depreciation	Other costs	Contracted out R&D	Foreign R&D	
											[Percent]							
Distribution by industry:																		
Management of companies and enterprises	55	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Health care services	621-23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	78.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other nonmanufacturing	56, 61, 624, 71, 72, 81	1.0	2.8	18.5	22.6	22.1	43.4	44.3	0.0	0.0	0.0	49.5	55.5	0.0	48.0	0.0	20.6	0.0
Small nonmanufacturing companies [2]	Fewer than 15 employees	8.9	0.2	2.4	0.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0	0.0
Distribution by size of company [Number of employees]																		
Total		8.6	6.9	32.2	6.6	6.0	11.3	70.3	63.7	38.3	48.4	50.7	54.7	9.2	59.8	7.4	5.3	4.5
5 to 24		6.4	1.5	7.1	0.6	0.6	0.0	0.0	0.0	0.0	0.0	58.5	100.0	8.2	43.9	0.0	0.0	0.0
25 to 49		4.3	0.2	4.4	1.2	1.0	2.4	36.5	100.0	6.8	89.2	50.7	55.1	31.0	43.5	1.4	0.0	0.0
50 to 99		4.4	0.3	6.1	1.6	2.2	1.6	24.2	93.3	98.7	11.8	34.4	40.6	2.4	27.4	1.0	0.0	0.0
100 to 249		3.1	1.7	13.8	9.7	10.8	6.3	64.9	79.8	100.0	65.7	45.3	46.0	19.4	45.8	11.7	3.8	0.0
250 to 499		3.7	2.9	15.0	7.6	7.1	13.7	46.2	78.8	27.8	35.9	38.8	48.4	3.4	37.1	0.9	5.4	0.0
500 to 999		6.3	6.7	20.7	15.8	16.4	9.3	14.5	35.0	74.9	79.2	38.1	27.5	1.8	45.0	5.6	8.7	0.0
1,000 to 4,999		7.3	9.8	29.8	11.1	11.2	7.4	61.4	99.8	91.6	93.6	37.6	38.5	8.3	37.6	1.7	4.8	42.9
5,000 to 9,999		12.0	11.4	40.2	7.1	7.0	7.9	69.7	84.6	88.0	98.1	47.6	46.8	3.4	61.4	2.4	1.2	21.8
10,000 to 24,999		3.6	5.5	38.8	0.7	1.6	0.0	97.1	98.9	74.7	83.7	60.3	62.5	3.9	69.0	0.7	0.6	1.4
25,000 or more		10.7	5.6	52.0	6.5	4.4	11.7	72.5	54.3	32.3	43.7	59.1	62.1	13.6	68.4	13.0	7.2	0.0

[1] "Other manufacturing" is intentionally left blank to allow for possible future North American Industry Classification System (NAICS) expansion.

[2] The frame from which the statistical sample was selected was divided into two partitions based on total company employment. In the manufacturing sector, companies with employment of 50 or more were included in the large company partition. In the nonmanufacturing sector, companies with employment of 15 or more were included in the large company partition. Companies in the respective sectors with employment below these values, but with at least 5 employees, were included in the small company partition. The purpose of partitioning the sample this way was to reduce the variability in industry estimates largely attributed to the random year-to-year selection of small companies by industry and the high sampling weights that sometimes were assigned to them. Because of this, detailed industry statistics were possible only from the large company partition; detailed industry statistics from the small company partition were not possible. Statistics from the small company partition are shown separately and are included in manufacturing, nonmanufacturing, and all industries totals. For more detailed information, please see "frame creation" and "sample selection" in Section B.

KEY: -- = Indicates data not collected.

NOTE: Starting with the 1999 survey, estimates are based on the North American Industry Classification System (NAICS). In prior years, estimates were based on the Standard Industrial Classification (SIC) system. The figures in this table represent the percentage of the value in a given table cell in the Section A tables that has been imputed. In those tables, cells for which more than 50 percent of the value is imputed are flagged with an "(S)". Cells that contain 0.0 indicate that no imputation was performed or, if performed, imputation accounted for less than 0.1 percent of the estimate for the indicated item.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table B-6. **Survey of Industrial Research and Development--percentage of R&D-performing companies that reported non-zero data for major survey items: 1999**

Data item	Form RD-1 [1,2]	Form RD-1A [1,2]
Sales [4]	99.0	97.2
Total employment [4]	99.0	99.6
Scientist and engineers	76.7	85.5
Federal R&D [3,4]	99.8	99.9
Department of Defense	6.0	NA
NASA	2.5	NA
Department of Energy	1.8	NA
Other Federal agencies	5.8	NA
Company R&D [3]	99.8	99.9
Contracted out R&D	18.6	12.5
Foreign R&D	33.2	6.7
Total R&D [4]	100.0	100.0
Wages and salaries	67.5	NA
Materials and supplies	60.8	NA
R&D depreciation	36.6	NA
Other costs by type of expense	60.8	NA
Energy R&D	3.5	NA
Basic research:		
Total	23.6	28.9
Company-funded	22.5	27.1
Federally funded	4.2	3.3
Applied research:		
Total	41.4	38.2
Company-funded	39.8	36.4
Federally funded	6.3	4.2
Development:		
Total	70.3	69.7
Company-funded	68.6	68.3
Federally funded	7.7	4.7

[1] Percentages are based on reported data for companies that reported total R&D expenditures. Imputed data are not included. Companies that reported they were out of scope, out of business, merged with another company, or had no R&D expenditures for 1999 were excluded from the calculations.

[2] See technical notes for descriptions of the survey questionnaire forms.

[3] "Federal R&D" and for "Company R&D" are considered together; companies that report "Total R&D" and either of these expenditures implicitly report both company and Federal R&D, since these two items sum to total R&D.

[4] Response to four data items on the questionnaires, total R&D, Federal R&D, sales, and total employment, was mandatory. Response to all other items was voluntary.

KEY: NA = Not available.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Industrial Research and Development: 1999

Table B-7. **Survey of Industrial Research and Development--funds for and number of companies that performed industrial basic research, applied research, and development, in the U.S. and funds and percent of funds not distributed, by industry and by size of company, by source of funds: 1999**

Industry and size of company	NAICS codes	Total				Basic research			
		Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
			[In millions of dollars]				[In millions of dollars]		
Distribution by industry:									
All industries	21-23, 31-33, 42, 44-81	39,005	182,823	22,535	160,288	14,186	11,577	1,442	10,135
Manufacturing	31-33	18,059	116,921	17,055	99,865	6,544	(D)	(D)	5,796
Food	311	526	1,132	0	1,132	286	32	0	32
Beverage and tobacco products	312	6	(D)	0	(D)	1	(D)	0	(D)
Textiles, apparel, and leather	313-16	441	334	0	334	286	46	0	46
Wood products	321	144	70	0	70	75	19	0	19
Paper, printing and support activities	322, 323	195	(D)	(D)	2,474	76	112	0	112
Petroleum and coal products	324	61	615	(D)	(D)	51	49	(D)	(D)
Chemicals	325	847	20,246	194	20,051	181	2,773	20	2,753
Basic chemicals	3251	136	2,746	98	2,648	63	(D)	(D)	(D)
Resin, synthetic rubber, fibers, and filament	3252	14	(D)	(D)	2,216	6	(D)	0	(D)
Pharmaceuticals and medicines	3254	175	(D)	(D)	12,236	15	1,984	0	1,984
Other chemicals	325 (minus 3251-52, 3254)	521	(D)	(D)	2,951	96	(D)	(D)	139
Plastics and rubber products	326	679	1,785	0	1,785	276	152	0	152
Nonmetallic mineral products	327	237	(D)	(D)	595	108	(D)	(D)	30
Primary metals	331	207	470	12	457	14	(D)	(D)	(D)
Fabricated metal products	332	1,202	1,655	46	1,608	417	103	0	103
Machinery	333	1,466	6,057	(S) 399	5,658	462	(D)	(D)	319
Computer and electronic products	334	1,156	35,932	5,993	29,939	258	1,091	18	1,073
Computers and peripheral equipment	3341	119	(D)	(D)	4,126	30	138	0	138
Communications equipment	3342	162	6,003	206	5,797	58	(D)	(D)	102
Semiconductor and other electronic components	3344	441	10,701	77	10,624	80	326	1	325
Navigational, measuring, electromedical, and control instruments	3345	279	14,337	5,705	8,632	65	383	13	370
Other computer and electronic products	334 (minus 3341-42, 3344-45)	153	(D)	(D)	760	23	(D)	(D)	139

See explanatory information and SOURCE at end of table

Table B-7. **Survey of Industrial Research and Development--funds for and number of companies that performed industrial basic research, applied research, and development, in the U.S. and funds and percent of funds not distributed, by industry and by size of company, by source of funds: 1999**

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Industry and size of company	NAICS codes	Total				Basic research			
		Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
			[In millions of dollars]				[In millions of dollars]		
Distribution by industry:									
Electrical equipment, appliances, and components	335	384	(D)	(D)	3,820	116	(D)	(D)	314
Transportation equipment	336	449	33,965	10,037	23,928	95	(D)	(D)	357
Motor vehicles, trailers, and parts	3361-63	306	(D)	(D)	17,987	55	(D)	(D)	158
Aerospace products and parts	3364	24	14,425	9,117	5,309	8	(D)	(D)	138
Other transportation equipment	336 (minus 3361-64)	119	(D)	(D)	632	32	61	0	61
Furniture and related products	337	204	248	0	248	56	31	0	31
Miscellaneous manufacturing	339	548	3,851	26	3,825	176	138	1	137
Medical equipment and supplies	3391	264	(D)	(D)	3,251	95	88	1	86
Other miscellaneous manufacturing	339 (minus 3391)	284	(D)	(D)	574	81	50	0	50
Other manufacturing [1]	31-33 (minus 311-16, 321-27, 331-37, 339)	--	--	--	--	--	--	--	--
Small manufacturing companies [2]	Fewer than 50 employees	9,300	3,019	69	2,950	3,600	130	15	115

See explanatory information and SOURCE at end of table.

Table B-7. **Survey of Industrial Research and Development--funds for and number of companies that performed industrial basic research, applied research, and development, in the U.S. and funds and percent of funds not distributed, by industry and by size of company, by source of funds: 1999**

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Industry and size of company	NAICS codes	Total				Basic research			
		Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
			[In millions of dollars]				[In millions of dollars]		
Distribution by industry:									
Nonmanufacturing	21-23, 42, 44-81	20,946	65,902	5,479	60,423	7,642	(D)	(D)	4,339
Mining, extraction, and support activities	21	217	(D)	(D)	2,352	4	32	0	32
Utilities	22	57	142	17	126	11	(S) 6	0	(S) 6
Construction	23	558	691	2	690	203	(D)	(D)	48
Trade	42, 44, 45	2,670	19,616	95	19,521	919	730	8	722
Transportation and warehousing	48, 49	126	460	0	460	60	99	0	99
Information	51	1,689	15,389	497	14,892	302	930	7	923
Publishing	511	1,302	11,302	49	11,253	228	(D)	(D)	(D)
Newspaper, periodical, book, and database	5111	155	371	0	371	2	(D)	(D)	(D)
Software	5112	1,147	10,931	49	10,882	226	551	3	549
Broadcasting and telecommunications	513	84	(D)	(D)	1,393	59	(D)	(D)	(D)
Radio and television broadcasting	5131	51	(D)	(D)	(D)	50	(D)	(D)	1
Telecommunications	5133	15	(D)	(D)	(D)	3	(D)	0	(D)
Other broadcasting and telecommunications	513 (minus 5131, 5133)	17	31	13	18	6	(D)	0	(D)
Other information	51 (minus 511, 513)	303	(D)	(D)	2,246	14	325	0	325
Finance, insurance, and real estate	52, 53	257	(D)	(D)	1,570	69	(D)	(D)	47
Professional, scientific, and technical services	54	3,967	18,994	4,615	14,379	1,030	2,631	542	2,089
Architectural, engineering, and related services	5413	1,044	3,580	1,177	2,402	224	244	92	152
Computer systems design and related services	5415	1,653	(D)	(D)	3,989	363	(D)	(D)	461
Scientific R&D services	5417	913	10,470	3,057	7,413	322	1,712	394	1,318
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	356	(D)	(D)	575	119	(D)	(D)	158
Management of companies and enterprises	55	27	(D)	(D)	72	2	13	0	13
Health care services	621-23	404	642	10	631	250	42	2	40
Other nonmanufacturing	56, 61, 624, 71, 72, 81	965	(D)	(D)	752	538	(D)	(D)	154
Small nonmanufacturing companies [2]	Fewer than 15 employees	10,002	5,203	227	4,977	4,249	166	1	165

See explanatory information and SOURCE at end of table.

Table B-7. **Survey of Industrial Research and Development–funds for and nu research, and development, in the U.S. and funds and percent of funds not di**

Industry and size of company	
Distribution by size of company: [Number of employees]	
Total	
5 to 24	
25 to 49	
50 to 99	
100 to 249	
250 to 499	
500 to 999	
1,000 to 4,999	
5,000 to 9,999	
10,000 to 24,999	
25,000 or more	

See explanatory information and SOURCE at end of table.

mber of companies that performed industrial basic research, applied
istributed, by industry and by size of company, by source of funds: 1999

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Total				Basic research			
Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
	[In millions of dollars]				[In millions of dollars]		
39,005	182,823	22,535	160,288	14,186	11,577	1,442	10,135
18,355	7,004	611	6,393	7,072	476	25	451
6,749	4,750	368	4,382	2,712	592	125	467
5,101	7,225	603	6,623	1,496	793	87	706
4,083	7,213	674	6,540	1,338	808	109	699
1,788	7,892	485	7,407	753	(D)	(D)	876
1,117	7,032	591	6,441	371	(D)	(D)	1,015
1,157	24,840	896	23,944	244	1,826	48	1,778
287	16,376	2,194	14,182	68	(D)	(D)	572
198	24,922	397	24,525	45	(D)	(D)	2,156
166	75,569	15,717	59,852	81	(D)	(D)	1,415

Table B-7. **Survey of Industrial Research and Development--funds for and number of companies that performed industrial basic research, applied research, and development, in the U.S. and funds and percent of funds not distributed, by industry and by size of company, by source of funds: 1999**

Industry and size of company	NAICS codes	Applied research				Development			
		Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
			[In millions of dollars]				[In millions of dollars]		
Distribution by industry:									
All industries	21-23, 31-33, 42, 44-81	14,369	25,677	2,254	23,423	26,454	99,707	8,606	91,101
Manufacturing	31-33	7,445	(D)	(D)	16,052	12,503	56,609	6,566	50,043
Food	311	216	244	0	244	328	815	0	815
Beverage and tobacco products	312	2	(D)	0	(D)	5	211	0	211
Textiles, apparel, and leather	313-16	162	37	0	37	270	163	0	163
Wood products	321	27	(D)	(D)	17	116	(D)	(D)	32
Paper, printing and support activities	322, 323	83	467	0	467	65	(D)	(D)	838
Petroleum and coal products	324	57	141	0	141	56	288	0	288
Chemicals	325	328	4,198	70	4,127	610	10,042	88	9,954
Basic chemicals	3251	62	(D)	(D)	(D)	91	855	43	811
Resin, synthetic rubber, fibers, and filament	3252	8	(D)	(D)	(D)	10	(D)	(D)	1,116
Pharmaceuticals and medicines	3254	26	(D)	(D)	2,237	117	(D)	(D)	6,642
Other chemicals	325 (minus 3251-52, 3254)	231	(D)	(D)	617	391	(D)	(D)	1,384
Plastics and rubber products	326	300	259	0	259	477	1,077	0	1,077
Nonmetallic mineral products	327	112	(D)	(D)	167	181	(D)	(D)	342
Primary metals	331	98	(D)	(D)	(D)	87	174	4	170
Fabricated metal products	332	649	177	6	171	1,019	756	40	715
Machinery	333	487	(D)	(D)	666	1,012	3,907	86	3,821
Computer and electronic products	334	598	5,937	54	5,883	937	11,430	820	10,610
Computers and peripheral equipment	3341	26	(D)	(D)	2,002	65	(D)	(D)	(S) 1,288
Communications equipment	3342	66	(D)	(D)	499	132	(D)	(D)	1,591
Semiconductor and other electronic components	3344	244	2,701	28	2,673	400	3,944	47	3,896
Navigational, measuring, electromedical, and control instruments	3345	141	618	13	606	190	4,078	706	3,372
Other computer and electronic products	334 (minus 3341-42, 3344-45)	119	(D)	(D)	(S) 103	148	463	0	463
Electrical equipment, appliances, and components	335	133	(D)	(D)	712	289	(D)	(D)	2,449
Transportation equipment	336	219	2,931	641	2,290	331	(D)	(D)	13,006

See explanatory information and SOURCE at end of table.

Table B-7. **Survey of Industrial Research and Development--funds for and n research, and development, in the U.S. and funds and percent of funds not**

Industry and size of company	NAICS codes
Distribution by industry:	
Motor vehicles, trailers, and parts	33
Aerospace products and parts	
Other transportation equipment	336 (minus 33
Furniture and related products	
Miscellaneous manufacturing	
Medical equipment and supplies	
Other miscellaneous manufacturing	339 (minus
Other manufacturing [1]	31-33 (minus 311-16, 3 331-3
Small manufacturing companies [2]	Fewer than 50 emp

See explanatory information and SOURCE at end of table.

umber of companies that performed industrial basic research, applied distributed, by industry and by size of company, by source of funds: 1999

Page 6 of 12

	Applied research				Development			
	Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
		[In millions of dollars]				[In millions of dollars]		
61-63	161	(D)	(D)	1,742	220	(D)	(D)	9,418
3364	13	(D)	(D)	465	17	7,954	4,755	3,199
1-64)	45	(D)	(D)	82	93	(D)	(D)	389
337	41	14	0	14	140	171	0	171
339	225	255	4	251	374	2,988	20	2,968
3391	118	(D)	(D)	171	176	2,615	20	2,594
3391)	107	(D)	(D)	80	198	373	0	373
21-27, , 339)	--	--	--	--	--	--	--	--
loyees	3,700	397	36	362	6,199	2,432	19	2,413

Table B-7. **Survey of Industrial Research and Development–funds for and number of companies that performed industrial basic research, applied research, and development, in the U.S. and funds and percent of funds not distributed, by industry and by size of company, by source of funds: 1999**

Industry and size of company	NAICS codes	Applied research				Development			
		Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
			[In millions of dollars]				[In millions of dollars]		
Distribution by industry:									
Nonmanufacturing	21-23, 42, 44-81	6,924	(D)	(D)	7,371	13,950	43,098	2,040	41,058
Mining, extraction, and support activities	21	114	(D)	(D)	171	214	2,149	0	2,149
Utilities	22	22	32	0	32	30	84	17	67
Construction	23	202	21	0	21	255	(D)	(D)	596
Trade	42, 44, 45	1,004	1,994	24	1,969	1,534	15,523	6	15,517
Transportation and warehousing	48, 49	102	61	0	61	123	77	0	77
Information	51	472	1,767	110	1,657	1,294	8,698	(S) 364	8,334
Publishing	511	385	(D)	(D)	(D)	1,000	6,014	22	5,992
Newspaper, periodical, book, and database	5111	98	(D)	(D)	(D)	102	287	0	287
Software	5112	287	1,181	21	1,160	897	5,727	22	5,705
Broadcasting and telecommunications	513	14	(D)	(D)	(D)	19	(D)	(D)	606
Radio and television broadcasting	5131	1	(D)	(D)	0	2	(D)	(D)	(D)
Telecommunications	5133	6	(D)	(D)	(D)	9	(D)	(D)	493
Other broadcasting and telecommunications	513 (minus 5131, 5133)	7	5	0	5	8	(D)	0	(D)
Other information	51 (minus 511, 513)	72	105	0	105	274	(D)	(D)	1,736
Finance, insurance, and real estate	52, 53	20	32	0	32	193	1,448	0	1,448
Professional, scientific, and technical services	54	1,444	4,294	1,081	3,213	2,753	9,163	1,564	7,598
Architectural, engineering, and related services	5413	316	481	197	284	649	1,894	343	1,551
Computer systems design and related services	5415	407	(D)	(D)	507	1,245	2,925	207	2,718
Scientific R&D services	5417	514	3,092	815	2,276	575	4,092	1,014	3,078
Other professional, scientific, and technical services	54 (minus 5413, 5415, 5417)	206	(D)	(D)	146	282	252	0	252
Management of companies and enterprises	55	1	(D)	0	(D)	25	(D)	(D)	(D)
Health care services	621-23	203	(D)	(D)	(D)	52	(D)	(D)	(D)
Other nonmanufacturing	56, 61, 624, 71, 72, 81	335	(D)	(D)	82	471	(D)	(D)	508
Small nonmanufacturing companies [2]	Fewer than 15 employees	2,999	249	153	96	7,002	4,752	70	4,682

See explanatory information and SOURCE at end of table.

Table B-7. **Survey of Industrial Research and Development--funds for and research, and development, in the U.S. and funds and percent of funds no**

Industry and size of company	
Distribution by size of company: [Number of employees]	
Total	
5 to 24	
25 to 49	
50 to 99	
100 to 249	
250 to 499	
500 to 999	
1,000 to 4,999	
5,000 to 9,999	
10,000 to 24,999	
25,000 or more	

See explanatory information and SOURCE at end of table.

number of companies that performed industrial basic research, applied
t distributed, by industry and by size of company, by source of funds: 1999

	Applied research				Development			
	Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
		[In millions of dollars]				[In millions of dollars]		
	14,369	25,677	2,254	23,423	26,454	99,707	8,606	91,101
	6,157	771	266	505	12,024	5,581	295	5,286
	2,873	866	67	799	4,862	2,978	85	2,893
	1,709	1,153	72	1,081	3,607	5,028	402	4,626
	1,821	1,867	176	1,691	2,852	3,825	335	3,490
	609	(D)	(D)	919	1,068	5,417	195	5,222
	447	(D)	(D)	1,315	733	3,573	270	3,302
	497	4,009	118	3,891	878	15,887	407	15,480
	120	(D)	(D)	2,392	217	9,984	393	9,592
	83	(D)	(D)	4,959	131	10,154	54	10,100
	50	(D)	(D)	5,871	78	37,280	6,171	31,109

Table B-7. **Survey of Industrial Research and Development--funds for and research, and development, in the U.S. and funds and percent of funds n**

Industry and size of company	NAICS codes
Distribution by industry:	
All industries	21-23,31-33,4
Manufacturing	
Food	
Beverage and tobacco products	
Textiles, apparel, and leather	
Wood products	
Paper, printing and support activities	3
Petroleum and coal products	
Chemicals	
Basic chemicals	
Resin, synthetic rubber, fibers, and filament	
Pharmaceuticals and medicines	
Other chemicals	325 (minus 3251-5
Plastics and rubber products	
Nonmetallic mineral products	
Primary metals	
Fabricated metal products	
Machinery	
Computer and electronic products	
Computers and peripheral equipment	
Communications equipment	
Semiconductor and other electronic components	
Navigational, measuring, electromedical, and control instruments	
Other computer and electronic products	334 (minus 3341-42, 3
Electrical equipment, appliances, and components	
Transportation equipment	

See explanatory information and SOURCE at end of table.

number of companies that performed industrial basic research, applied ot distributed, by industry and by size of company, by source of funds: 1999

	Expenditures not distributed				Percent of expenditures not distributed			
	Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
		[In millions of dollars]				[In millions of dollars]		
2,44-81	2,539	45,862	10,232	35,629	6	25	45	22
31-33	988	36,703	8,728	27,974	5	31	51	28
311	7	(S) 40	0	(S) 40	1	4	0	4
312	1	(D)	0	(D)	16	1	0	1
313-16	6	(D)	0	(D)	1	(D)	0	(D)
321	2	(D)	0	(D)	1	(D)	0	(D)
22, 323	9	(D)	(D)	(S) 1,057	4	44	99	43
324	2	(D)	(D)	(D)	3	(D)	100	21
325	81	(D)	(D)	3,217	9	(D)	(D)	16
3251	8	798	(D)	(D)	5	29	(D)	(D)
3252	3	(D)	(D)	(D)	21	11	0	(D)
3254	52	(D)	(D)	1,373	29	11	4	11
2, 3254)	19	(D)	(D)	811	3	27	0	27
326	51	297	0	297	7	17	0	17
327	5	(D)	(D)	(D)	2	9	0	(D)
331	36	55	0	55	17	12	0	12
332	14	(D)	(D)	619	1	(D)	(D)	38
333	43	(D)	(D)	852	2	(D)	(D)	15
334	139	(D)	(D)	12,373	12	(D)	(D)	41
3341	36	(D)	(D)	698	30	17	0	17
3342	9	(D)	(D)	(D)	5	(D)	62	(D)
3344	11	(D)	0	(D)	2	(D)	0	(D)
3345	80	(D)	(D)	4,285	28	(D)	(D)	50
344-45)	3	(D)	(D)	(S) 55	1	7	0	7
335	21	(D)	(D)	345	5	9	0	9
336	45	11,534	3,259	8,275	10	34	32	35

Table B-7. **Survey of Industrial Research and Development--funds for and nun research, and development, in the U.S. and funds and percent of funds not dis**

Industry and size of company	NAICS codes
Distribution by industry:	
Motor vehicles, trailers, and parts	3361-
Aerospace products and parts	33
Other transportation equipment	336 (minus 3361-
Furniture and related products	3
Miscellaneous manufacturing	3
Medical equipment and supplies	33
Other miscellaneous manufacturing	339 (minus 33
Other manufacturing [1]	31-33 (minus 311-16, 321- 331-37, 3
Small manufacturing companies [2]	Fewer than 50 employ

See explanatory information and SOURCE at end of table.

nber of companies that performed industrial basic research, applied stributed, by industry and by size of company, by source of funds: 1999

	Expenditures not distributed				Percent of expenditures not distributed			
	Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
		[In millions of dollars]				[In millions of dollars]		
-63	31	(D)	(D)	(D)	10	37	3	(D)
364	8	4,484	2,978	1,506	33	31	33	28
64)	6	(D)	(D)	(D)	5	28	38	(D)
337	2	(D)	0	(D)	0	(D)	0	(D)
339	22	(D)	(D)	470	4	12	0	12
391	13	(D)	(D)	400	4	12	0	12
91)	10	(D)	(D)	71	3	12	0	12
27, 39)	0	--	--	--	0	--	--	--
ees	500	61	0	61	5	2	0	2

Table B-7. **Survey of Industrial Research and Development–funds for and r research, and development, in the U.S. and funds and percent of funds not**

industry and size of company	NAICS codes
Distribution by industry:	
Nonmanufacturing	21-23, 42,
Mining, extraction, and support activities	
Utilities	
Construction	
Trade	42,
Transportation and warehousing	
Information	
Publishing	
Newspaper, periodical, book, and database	
Software	
Broadcasting and telecommunications	
Radio and television broadcasting	
Telecommunications	
Other broadcasting and telecommunications	513 (minus 5131,
Other information	51 (minus 51
Finance, insurance, and real estate	
Professional, scientific, and technical services	
Architectural, engineering, and related services	
Computer systems design and related services	
Scientific R&D services	
Other professional, scientific, and technical services	54 (minus 5413, 5415
Management of companies and enterprises	
Health care services	
Other nonmanufacturing	56, 61, 624, 71,
Small nonmanufacturing companies [2]	Fewer than 15 emp

See explanatory information and SOURCE at end of table.

number of companies that performed industrial basic research, applied
distributed, by industry and by size of company, by source of funds: 1999

	Expenditures not distributed				Percent of expenditures not distributed			
	Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
		[In millions of dollars]				[In millions of dollars]		
44-81	1,551	9,159	1,504	7,655	7	14	27	13
21	0	0	0	0	0	0	0	0
22	4	(D)	0	(D)	6	(D)	0	(D)
23	51	(D)	0	(D)	9	(D)	0	(D)
44, 45	119	1,369	(S) 56	1,312	4	7	60	7
48, 49	2	(D)	0	(D)	1	(D)	0	(D)
51	67	3,994	16	3,979	3	26	3	27
511	46	(D)	(D)	3,477	3	(D)	(D)	31
5111	1	(D)	(D)	(D)	0	(D)	(D)	(D)
5112	45	3,471	3	3,468	3	32	6	32
513	17	(D)	(D)	421	20	24	3	30
5131	0	0	0	0	0	0	0	0
5133	7	(D)	(D)	(D)	46	29	0	33
, 5133)	9	(D)	(D)	(D)	50	41	100	0
1, 513)	5	(D)	(D)	81	1	4	0	4
52, 53	5	(D)	(D)	43	1	3	0	3
54	249	2,906	1,428	1,479	6	15	31	10
5413	48	960	545	415	4	27	46	17
5415	130	(D)	(D)	303	7	8	8	8
5417	68	(D)	(D)	741	7	(D)	(D)	10
, 5417)	3	(D)	(D)	(D)	0	7	86	(D)
55	0	0	0	0	0	0	0	0
621-23	1	(D)	(D)	(D)	0	(D)	(D)	(D)
, 72, 81	53	(D)	(D)	(S) 9	5	1	0	1
loyees	1,000	36	3	34	9	1	1	1

Table B-7. **Survey of Industrial Research and Development--funds for and research, and development, in the U.S. and funds and percent of funds no**

Industry and size of company	
Distribution by size of company: [Number of employees]	
Total	
5 to 24	
25 to 49	
50 to 99	
100 to 249	
250 to 499	
500 to 999	
1,000 to 4,999	
5,000 to 9,999	
10,000 to 24,999	
25,000 or more	

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[1] "Other manufacturing" is intentionally left blank to allow for possible future North Amer

[2] The frame from which the statistical sample was selected was divided into two partitio employment of 50 or more were included in the large company partition. In the nonma company partition. Companies in the respective sectors with employment below thes The purpose of partitioning the sample this way was to reduce the variability in indust by industry and the high sampling weights that sometimes were assigned to them. Be partition, detailed industry statistics from the small company partition were not possibl in manufacturing, nonmanufacturing, and all industries totals. For more detailed infor

KEY: (D) = Data have been withheld to avoid disclosing operations of individual c
(S) = Indicates imputation of more than 50 percent.
-- = Indicates data not collected.

NOTES: Starting with the 1999 survey, estimates are based on the North American I Standard Industrial Classification (SIC) system.

The company R&D in this table is the industrial R&D performed within compa Federal Government. The funds predominantly are the company's own, but as other companies, research institutions, universities and colleges, nonpro from this table are company-funded R&D not performed within the company and company-funded R&D not performed in the U.S. (e.g., R&D not perform foreign organizations).

SOURCE: National Science Foundation/Division of Science Resources Statistics, Surv

number of companies that performed industrial basic research, applied
t distributed, by industry and by size of company, by source of funds: 1999

	Expenditures not distributed				Percent of expenditures not distributed			
	Number of companies	Total	Federal	Company	Number of companies	Total	Federal	Company
		[In millions of dollars]				[In millions of dollars]		
	2,539	45,862	10,232	35,629	6	25	45	22
	1,551	(D)	(D)	151	8	(D)	(D)	2
	252	314	91	224	3	7	25	5
	219	251	42	209	4	3	7	3
	142	714	55	659	3	10	8	10
	52	447	(S) 57	390	2	6	12	5
	85	936	128	809	7	13	22	13
	123	(D)	(D)	2,794	10	(D)	(D)	12
	42	3,115	1,489	1,626	14	19	68	11
	41	7,645	335	7,309	20	31	85	30
	31	29,146	7,688	21,457	18	39	49	36

rican Industry Classification System (NAICS) expansion.

ns based on total company employment. In the manufacturing sector, companies with
nufacturing sector, companies with employment of 15 or more were included in the large
e values, but with at least 5 employees, were included in the small company partition.
y estimates largely attributed to the random year-to-year selection of small companies
cause of this, detailed industry statistics were possible only from the large company
e. Statistics from the small company partition are shown separately and are included
mation, please see "frame creation" and "sample selection" in Section B.

mpanies.

ndustry Classification System (NAICS). In prior years, estimates were based on the

ny facilities funded from all sources except the
also include funds from outside organizations such
it organizations, and State governments. Excluded
(e.g., R&D contracted out to other organizations)
ed on U.S. soil by foreign subsidiaries or other

ey of Industrial Research and Development: 1999

SURVEY DEFINITIONS

Employment, FTE R&D Scientists and Engineers. Number of people domestically employed by R&D-performing companies who were engaged in scientific or engineering work at a level that required knowledge, gained either formally or by experience, of engineering or of the physical, biological, mathematical, statistical, or computer sciences equivalent to at least that acquired through completion of a 4-year college program with a major in one of those fields. The statistics show full-time-equivalent (FTE) employment of persons employed by the company during the January following the survey year who were assigned full time to R&D, plus a prorated number of employees who worked part time on R&D.

Employment, Total. Number of people domestically employed by R&D-performing companies in all activities during the pay period that includes the 12th of March, the date most employers use when paying first quarter employment taxes to the Internal Revenue Service.

Federally Funded R&D Centers (FFRDCs). R&D-performing organizations administered by industrial, academic, or other institutions on a nonprofit basis, and exclusively or substantially financed by the Federal Government. For the statistics in this report, R&D expenditures of industry-administered FFRDCs were included with the Federal R&D data of the industry classification of each of the administering firms. The industry-administered FFRDCs included in the 1999 survey, their corporate administrators, and location are indicated below.

FFRDCs Supported by the Department of Energy

- Idaho National Engineering and Environmental Laboratory, Idaho Falls, ID, administered by Lockheed Martin Idaho Technologies Co.
- Oak Ridge National Laboratory, Oak Ridge, TN, administered by Lockheed Martin Energy Research Co.
- Sandia National Laboratories, Albuquerque, NM, administered by Sandia Corporation a subsidiary of Lockheed Martin Corp.
- Savannah River Technology Center, Aiken, SC, administered by Westinghouse Corp.

FFRDC Supported by the Department of Health and Human Services, National Institutes of Health

- National Cancer Institute (NCI) Frederick Cancer Research Facility, Frederick, MD, administered by Science Applications International Corporation, Advanced Bioscience Laboratories, Inc., Charles River Laboratories, Inc., and Data Management Services, Inc.

Funds for R&D, Company and Other Non-Federal. The cost of R&D performed within the company and funded by the company itself or by other non-Federal sources; does not include the cost of R&D supported by the company but contracted to outside organizations such as research institutions, universities and colleges, nonprofit organizations, or—to avoid double-counting—other companies.

Funds for R&D, Federal. The cost of R&D performed within the company under Federal R&D contracts or subcontracts and R&D portions of Federal procurement contracts and subcontracts; does not include the cost of R&D supported by the Federal Government but contracted to outside organizations such as research institutions, universities and colleges, nonprofit organizations, or other companies.

Funds for R&D, Total. The cost of R&D performed within the company in its own laboratories or in other company-owned or company-operated facilities, including expenses for wages and salaries, materials and supplies, property and other taxes, maintenance and repairs, depreciation, and an appropriate share of overhead; does not include capital expenditures or the cost of R&D contracted to outside organizations such as research institutions, universities and colleges, nonprofit organizations, or—to avoid double-counting—other companies.

Funds per R&D Scientist or Engineer. All costs associated with the performance of industrial R&D (salaries, wages, and fringe benefits paid to R&D scientists and engineers; materials and supplies used for R&D; depreciation on capital equipment and facilities used for R&D; and any other R&D costs) divided by the number of R&D scientists and engineers employed. To obtain a per person cost of R&D for a given year, the total R&D expenditures of that year were divided by an approximation of the number of full-time-equivalent (FTE) scientists and engineers engaged in the performance of R&D for that year. For accuracy, this approximation was the mean of the numbers of such FTE R&D-performing scientists and engineers as reported in January for the year in question and the subsequent year. For example, the mean of the numbers of FTE R&D scientists and engineers in January 1999 and January 2000 was divided into total 1999 R&D expenditures for a total cost per R&D scientist or engineer in 1999.

Net Sales and Receipts. Dollar values for goods sold or services rendered by R&D-performing companies to customers outside the company—including the Federal Government—less such items as returns, allowances, freight, charges, and excise taxes. Domestic intracompany transfers and sales by foreign subsidiaries were excluded, but transfers to foreign subsidiaries and export sales to foreign companies were included.

R&D and Industrial R&D. R&D is the planned, systematic pursuit of new knowledge or understanding toward general application (basic research); the acquisition of knowledge or understanding to meet a specific, recognized need (applied research); or the application of knowledge or understanding toward the production or improvement of a product, service, process, or method (development). *Basic research* analyzes properties, structures, and relationships toward formulating and testing hypotheses, theories, or laws; *applied research* is undertaken either to determine possible uses for the findings of basic research or to determine new ways of achieving some specific, predetermined objectives; and *development* draws on research findings or other scientific knowledge for the purpose of producing new or significantly improving products, services, processes, or methods. As used in this survey, industrial *basic research* is the pursuit of new scientific knowledge or understanding that does not have specific immediate commercial objectives, although it may be in fields of present or potential commercial interest; industrial *applied research* is investigation that may use findings of basic research toward discovering new scientific knowledge that has specific commercial objectives with respect to new products, services, processes, or methods; and industrial *development* is the systematic use of the knowledge or understanding gained from research or practical experience directed toward the production or significant improvement of useful products, services, processes, or methods, including the design and development of prototypes, materials, devices, and systems. The survey covers industrial R&D performed by people trained—either formally or by experience—in engineering or in the physical, biological, mathematical, statistical, or computer sciences and employed by a publicly or privately owned firm engaged in for-profit activity in the United States. Specifically excluded from the survey are quality control, routine product testing, market research, sales promotion, sales service, and other nontechnological activities; routine technical services; and research in the social sciences or psychology.

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SECTION C. SURVEY DOCUMENTS

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NATIONAL SCIENCE FOUNDATION
4201 WILSON BOULEVARD
ARLINGTON, VIRGINIA 22230

OFFICE OF THE DIRECTOR

FROM THE DIRECTOR
NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) requests your company's participation in the 1999 Survey of Industrial Research and Development that the Bureau of the Census is conducting for us. This annual survey is the only source of detailed information on U.S. industry's research and development (R&D) performance.

Your company's participation is vital to the accuracy of the resulting information. Because R&D expenditures are concentrated in relatively few companies, a completed response is needed from each surveyed firm — *there is no substitute for the information that you can provide.* Your company can be assured of complete confidentiality. Survey data will be released only in aggregate form so that responses of individual companies cannot be identified. We have enclosed a recent report from the survey to show you how these results are used.

If you have questions concerning the operation of this survey, please direct them to the Census Bureau on (301) 457–1339. In addition to the enclosed report, survey results also are made available in an annual report entitled *Research and Development in Industry.* If you would like to receive a copy of the most recent report, please call the NSF publication clearinghouse on (301) 947–2722 or send an e-mail message to paperpubs@nsf.gov.

Thank you for your assistance in this important effort.

Sincerely,

Rita R. Colwell

Rita R. Colwell
Director

Enclosures

RD-1-CL
(1-2000)

UNITED STATES DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. Census Bureau
Washington, DC 20233-0001
OFFICE OF THE DIRECTOR

FROM THE DIRECTOR
U.S. CENSUS BUREAU

We have enclosed your company's report form and instructions for the 1999 "Survey of Industrial Research and Development (R&D)." In addition to the traditional report form, we have included a Computerized Self-Administered Questionnaire diskette that you may use as an alternative format for reporting. Please refer to the instructions for installation. If you have any questions about installing or using the diskette, please contact the Electronic Reporting Staff on 301–457–4125.

The diskette and Form RD-1 contain information from the previous report for your company. **Please review the instructions, complete the diskette or the form, and return it within 60 days.** Information you report should cover the domestic operations of your consolidated enterprise for calendar year 1999. Federal law requires your response to four items identified on the form. Your voluntary response to all other items is needed to assure useful results.

Data from this survey have many business and policy uses. They provide information for examining R&D tax credits. Some businesses are able to use R&D tax credits to reduce their federal tax burden. The data also assist public officials in allocating research funding by state, which may benefit companies like yours. In addition, analysts use the results to compare spending in this country with other countries to ensure that U.S. businesses are not at a competitive disadvantage.

We recognize that providing this information is a burden, and we have worked hard to minimize it. For example, if you do not have book records for any item, **you may provide carefully prepared estimates.** The law that authorizes this survey (Title 13, United States Code) requires that we keep your report in full confidence. Only sworn Census Bureau employees will see your information, and they will use it only for statistical purposes.

The data from the 1999 survey will be published according to a new classification system, the North American Industry Classification System (NAICS). The NAICS, developed in partnership with United States, Canada, and Mexico, more accurately describes and reflects our ever-changing economy. It replaces the Standard Industrial Classification system. If you are interested in learning more about NAICS, please visit the web site (www.census.gov) and choose "NAICS."

We conduct this survey with National Science Foundation (NSF) support. We have enclosed a letter from the Director of NSF encouraging your response to the survey. If you have any questions, please call my staff on 301–457–1339. Thank you in advance for your cooperation.

Sincerely,

Kenneth Prewitt

Kenneth Prewitt

Enclosures

USCENSUSBUREAU
Helping You Make Informed Decisions
www.census.gov

PLEASE RETURN BY:

OMB No. 3145-0027: Approval Expires 12/31/2001

NOTICE – Your report to the Census Bureau is **confidential** by law (Title 13, U.S. Code). It may be seen only by sworn Census employees and may be used only for statistical purposes. The law also provides that copies retained in your files are immune from legal process.

RETURN TO

U.S. Census Bureau
1201 East 10th Street
Jeffersonville, IN 47132-0001

Name of person who supplied 1998 data

MANDATORY REPORTING REQUIREMENTS

Data supplied in items 1A and 1B and in item 3A, line 3, columns 4 and 6, for 1999 on this form will satisfy the mandatory reporting requirements. (Title 13, U.S. Code.)

PLEASE READ ENCLOSED INSTRUCTIONS BEFORE COMPLETING THIS FORM.

CENSUS USE ONLY

SURVEY CODE
4001

INDUSTRY CODE

WEIGHT

STATE

ADDRESS

SIC CODE

FORM **RD-1**
(12 22 99)

U.S. DEPARTMENT OF COMMERCE
U.S. CENSUS BUREAU
COLLECTING AND COMPILING AGENT FOR
THE NATIONAL SCIENCE FOUNDATION

SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1999

In correspondence pertaining to this report refer to this **CENSUS FILE NUMBER (11 digits)** ▶

(Please correct any error in name and address, including ZIP Code.)

THIS REPORT SHOULD COVER YOUR ENTIRE CONSOLIDATED DOMESTIC ENTERPRISE, INCLUDING ALL U.S. SUBSIDIARIES AND DIVISIONS.

The term "company" on this form refers to the consolidated domestic enterprise.

- Please complete this form by the date printed at the top of this page and return it in the envelope provided. Make a copy for your records.
- Please read the enclosed instructions before completing this form.
- Report figures in thousands of dollars. Reasonable estimates are acceptable.
- Explain significant changes in year-to-year data in the remarks section.

COVERAGE REVIEW

Was this company owned or controlled by another company on December 31, 1999?

1303 ☐ Yes – *See instructions for Coverage Review.*

1304 ☐ No – *Continue with item 1*

Section I – GENERAL COMPANY DATA

Item 1 – RECEIPTS AND EMPLOYMENT FOR THE COMPANY

	1998			1999		
	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
A. Sales, operating receipts and revenues from all domestic operations of the company, net of returns and allowances. (Report in thousands of dollars) EXCLUDE domestic intra-company transfers and sales by foreign subsidiaries. INCLUDE receipts for sales of products and services provided to other companies, individuals, U.S. Government agencies, and foreign countries.	101			102		
	Number			Number		
B. Domestic company employment in all activities during the pay period which includes the 12th of March 1999 (Item 1 of I.R.S. Form 941, if one Form 941 was filed for the entire company.)	111			112		

Item 2 – NUMBER OF RESEARCH AND DEVELOPMENT SCIENTISTS AND ENGINEERS

Apportion on a full-time equivalent basis. *See page 4 of the instruction booklet for more detail.*

	January 1999	January 2000
	Number	Number
A. Federal research and development	503	504
B. Company and other research and development	505	506
C. TOTAL – *Sum of lines 2A and 2B* ⟶	501	502

PLEASE CONTINUE ON REVERSE.

276

277

Section I - GENERAL COMPANY DATA - Continued

Item 3 - COSTS INCURRED FOR RESEARCH AND DEVELOPMENT
(Report in thousands of dollars)

		1998									1999								
		Federal funds (1)			Company and other (2)			Total ((1)+(2)) (3)			Federal funds (4)			Company and other (5)			Total ((4)+(5)) (6)		
		Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
A. Performed within the company 1. Basic research		301			302			303			304			305			306		
2. Applied research and development	a. Applied research	311			312			313			314			315			316		
	b. Development	321			322			323			324			325			326		
	c. **Total** - *Sum of lines a and b*	331			332			333			334			335			336		
3. **Total** - *Sum of lines 1 and 2.c.*		341			342			343			344			345			346		
B. Outside the company - **Federal** funds and **company** funds for research and development **performed by others** outside the company **within the United States** *(Exclude from 3A.3. above)*		351			352			353			354			355			356		
C. Foreign - **Company** funds for research and development **performed by foreign subsidiaries** or other organizations **outside the United States** *(Exclude from 3A.3. and 3B. above)*					362									365					
D. TOTAL - **Company and other funds, except Federal** (This line represents company sponsored research and development with the exception of "other funds.") - *Sum of 3A.3, B, and C, (column 5)* ⟶					372									375					

Item 4 - COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 2000

(Comparable to the 1999 figure reported in Item 3A.3., column (5).)

2000		
Bil.	Mil.	Thou.
401		

Section II - RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY

Item 5 - COSTS INCURRED FOR FEDERAL RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY PRINCIPAL GOVERNMENT AGENCY

Allocate the total reported in Item 3A., line 3, column (4), Federal funds, into the following principal agencies	Key code	1998 (1)			1999 (2)		
	5	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
1. Department of Defense	01						
2. National Aeronautics and Space Administration	02						
3. Department of Energy	03						
4. Other Federal agencies	04						
5. **TOTAL COSTS** - *Sum of lines 1 through 4* ⟶	05						

Item 6 - COSTS INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY MAJOR TYPE OF EXPENSE

Allocate the total reported in Item 3A., line 3, column (6), total company research and development - *Exclude lines 3B. and 3C.*	Key code	1998 (1)			1999 (2)		
	6	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
1. Wages and salaries of research and development personnel - *Include scientists and engineers, technicians, secretaries, and other personnel.*	01						
2. Costs of materials and supplies consumed - *Do not include in this item components, models, and other materials supplied by other research organizations.*	02						
3. R & D depreciation	05						
4. Other costs - *Include service and supporting costs, and share of overhead.*	03						
5. **TOTAL COSTS** - *Sum of lines 1 through 4* ⟶	04						

PLEASE CONTINUE ON PAGE 3.

FORM **RD-1 (Item 7)**
(12 22 99)

U.S. DEPART

COLLECTING AN
THE NATIONAL SC

SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1999

Section II — RESEARCH AND DEVELOPMENT PERFORME

Item 7 — COST OF RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY

Allocate the total reported in Item 3.A., line 3, columns (4) and (6), by the States in which your various rese
each State If necessary, you may report up to 10 percent of your total as "Not distributed by State."

Key code	State	1998						1999					
		Federal funds (1)			Total funds (2)			Federal funds (1)			Total funds (2)		
9		Bil.	Mil.	Thou	Bil.	Mil.	Thou	Bil.	Mil.	Thou	Bil.	Mil.	Thou
01	AL												
02	AK												
03	AZ												
04	AR												
05	CA												
06	CO												
07	CT												
08	DE												
09	DC												
10	FL												
11	GA												
12	HI												
13	ID												
14	IL												
15	IN												
16	IA												
17	KS												
18	KY												
19	LA												
20	ME												
21	MD												
22	MA												
23	MI												
24	MN												
25	MS												
26	MO												
53	**TOTAL COSTS** — ***Sum of lines 1 through 52***												

RTMENT OF COMMERCE
U.S. CENSUS BUREAU
ND COMPILING AGENT FOR
CIENCE FOUNDATION

Refer to this CENSUS FILE NUMBER in any correspondence pertaining to this report

ED WITHIN THE DOMESTIC COMPANY — Continued

Y BY STATE

search and development laboratories or facilities are located. Estimate the costs associated with

Key code	State	1998						1999					
		Federal funds (1)			Total funds (2)			Federal funds (1)			Total funds (2)		
9		Bil.	Mil.	Thou	Bil.	Mil.	Thou	Bil.	Mil.	Thou	Bil.	Mil.	Thou
27	MT												
28	NE												
29	NV												
30	NH												
31	NJ												
32	NM												
33	NY												
34	NC												
35	ND												
36	OH												
37	OK												
38	OR												
39	PA												
40	RI												
41	SC												
42	SD												
43	TN												
44	TX												
45	UT												
46	VT												
47	VA												
48	WA												
49	WV												
50	WI												
51	WY												
52	*												
→		963						964					

PLEASE CONTINUE ON REVERSE.

Section II — RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY — Continued

Item 8 - ENERGY RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY

- Report expenditures for energy research and development by type of energy sources. Include the project cost or portion of project cost incurred for the purpose of increasing energy resources or capabilities. These expenditures should be included in Item 3.A., line 3, columns (4) and (6).
- Estimate expenditures for energy research by energy source for 2000.

	Key code	1998						1999						2000					
		Federal funds (1)			Total funds (2)			Federal funds (1)			Total funds (2)			Projected Federal funds (3)			Projected total funds (4)		
	10	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
A. Nuclear	03																		
B. Fossil fuels	12																		
C. Geothermal, solar, conservation and utilization	16																		
D. All other energy	17																		
E. TOTAL – *Sum of lines A through D* →	18																		

Section III - RESEARCH AND DEVELOPMENT PERFORMED OUTSIDE THE DOMESTIC COMPANY WITH COMPANY FUNDS

Item 9 - FOREIGN RESEARCH AND DEVELOPMENT BY COUNTRY

Report the amount of total foreign research and development, Item 3.C., column (5), for the countries with the largest expenditures. If necessary, write in countries not listed. Report the balance of foreign research and development on line 9.

	Key code	1998 (1)			1999 (2)		
	12	Bil.	Mil.	Thou.	Bil.	Mil.	Thou.
1. Canada	01						
2. Germany	02						
3. France	03						
4. Japan	04						
5. United Kingdom	05						
6. Puerto Rico	06						
7. Other — *Specify*	07						
8. Other — *Specify*	08						
9. Balance not distributed	09						
10. TOTAL – *Sum of lines 1 through 9* →	10						

Item 10 - COVERAGE AND OPERATIONAL STATUS

Are research and development expenditures for the entire domestic enterprise, including subsidiaries, reported on this form?

1301 ☐ Yes 1302 ☐ No – *Please explain in the "Remarks" section below*

Item 11 - CERTIFICATION - This report is substantially accurate and has been prepared in accordance with instructions

Name of person to contact regarding this report	Telephone	Area code	Number	Extension

Signature of authorized official	Title	701 Date

801 Remarks

THANK YOU FOR YOUR RESPONSE.

RD-1(I)
(1-4-2000)

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

INSTRUCTIONS FOR SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1999
FORM RD-1

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Changes for the 1999 Survey

Implementation of North American Industry Classification System (NAICS)
The North American Industry Classification System is a new classification system developed in partnership among United States, Canada, and Mexico to more accurately describe and reflect our ever-changing economy. It replaces the Standard Industrial Classification system (SIC). If you are interested in learning more about NAICS, please visit the website **www.ntis.gov/naics**.

GENERAL INSTRUCTIONS

Comprehensive and timely information about the nature and support of corporate research and development activities is an important component in the overall assessment of our nation's scientific and technological resources. The information you provide is used to prepare national measures of industrial research and development (R&D) not available from any other source. By carefully completing this report, the accuracy of this information is assured.

TAX INCENTIVES – Most states offer some type of incentive for research and development activity. Many of the states offer an income tax credit modeled after the federal research and experimentation tax credit guidelines. Other types of incentives include sales and use tax credits and property tax credit. A few states which offer tax incentives are: California, Minnesota, Washington, and Wisconsin. For further information on state tax incentives, please contact the Comptroller of the Treasury in your state.

DUE DATE – Please complete and return this form in the envelope provided within 60 days. Make a copy for your records.

SURVEY SCOPE – This report covers publicly traded and privately-owned, nonfarm business firms in all sectors of the United States economy. It does not include operations owned by Federal, state or local governments, nonprofit organizations, or trust or pension plans.

If your company is owned by a Federal, state or local government, is a nonprofit organization, or is a trust or pension plan which performs no activity other than investments, do not report. Please note in the remarks section on the back page of the form and return it.

REPORTING ENTITY – Report research and development activities for all domestic operations of your **entire consolidated domestic enterprise**, including subsidiaries and divisions. The term "company" in these instructions refers to the consolidated domestic enterprise. Report for all parts of the company located in the 50 states and the District of Columbia. Report net receipts and employment figures for all parts of the company, even those that do not perform R&D, as long as they are located in the 50 states or the District of Columbia.

If this form has been directed to a holding company, report for all subsidiaries and operations under the ownership and control of the holding company.

If you report separately for a component of this company based upon an arrangement with the Census Bureau, please continue to do so.

COVERAGE REVIEW – Check the appropriate box if this company was owned or controlled by another company on December 31, 1999. If yes, follow the instructions below:

- If you have been reporting separately for this component of the company based upon an arrangement with the Census Bureau, please complete the form.
- If your company is owned by a foreign company, please complete the form and fill out the new owner information in the remarks section, page 4.
- If your company was purchased by another company on or prior to March 31, 1999, please write the name and address of the new owner in the remarks section, page 4, sign the form in Item 11, and fax the form to (301) 457–1318.
- If your company was purchased after March 31, 1999, please complete the form for the months prior to the purchase of your company, write the name and address of the new owner in the remarks section, page 4, and return the form in the envelope provided.

If you have questions, please call the R&D Survey staff at (301) 457-4677 to determine whether you are required to complete the form.

PERIOD COVERED BY THE REPORT – Report figures for calendar year 1999. Fiscal year data are acceptable for all items except for employment, provided your fiscal year ends between September 1999 and March 2000. Please report employment figures (Items 1B and 2) for the specific times indicated for these items.

HOW TO REPORT – Report all value figures in thousands of dollars. If you cannot answer a question from your company records, please estimate the answer carefully.

Example: 1,123,678,599 dollars.

	Bil.	Mil.	Thou.
Report	$1	123	679

If you estimate your answers in millions of dollars, please fill the thousands box with zeros.

Example: 1,124

	Bil.	Mil.	Thou.
Report	$1	124	000

FIGURES FOR 1998 PRINTED ON THE FORM – If your company reported for 1998, entries from that form have been printed on the present form. If these figures are incorrect, please revise them. Please describe in the "Remarks" section the reasons for any substantial increase or decrease in the 1999 figures entered on this form when compared to corresponding 1998 figures or changes in the 1998 figures. Examples of such reasons are new government contracts, acquisitions and divestitures, and revised accounting method. If you acquired or disposed of a unit performing an important amount of research and development during the 2-year period, please identify the unit in "Remarks," and give the total amount of research and development accounted for by that unit.

ADDITIONAL FORMS – Photocopies of this form are acceptable. If you require additional forms, write to the U.S. Census Bureau, 1201 East 10th Street, Jeffersonville, IN 47132-0001 or call (812) 218–3331.

GENERAL INSTRUCTIONS – Continued

FILING EXTENSIONS – If you cannot complete the form in 60 days, request an extension of time by:

- calling the Census Touchtone Data Entry System on 1-800-851-2014 (have your 10-digit Census File Number, "CFN", available. The CFN is printed on the form above your address.)

OR

- writing to the address below (Please include your 10-digit Census File Number):

U.S. Census Bureau
1201 East 10th Street
Jeffersonville, IN 47132-0001

ALTERNATIVE REPORTING FORMATS – Included with the survey form is a computer diskette. Reporting your company information on the diskette is an alternative means of completing the survey. **If you do report on the diskette do not mail in the paper form.**

Receiving your data on diskette benefits us through reduced processing costs. Please refer questions concerning operation of the diskette to the Electronic Reporting Staff at (301) 457–4125.

BURDEN HOUR ESTIMATE – Public reporting burden for this collection of information is estimated to average 20 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimates or any other aspects of this collection of information, including suggestions for reducing this burden, to Suzanne H. Plimpton, National Science Foundation, 4201 Wilson Boulevard, Room 485, Arlington, VA 22230.

Direct **QUESTIONS** regarding this form to the U.S. Census Bureau, Manufacturing and Construction Division, ATTN.: Special Studies Branch, Room 2135/4, Washington, DC 20233–6900, call (301) 457–1339 or E-mail to ronald.w.taylor@ccmail.census.gov. (Please see the instructions for Item 11 on page 7 for E-mail warning.)

DEFINITION OF RESEARCH AND DEVELOPMENT

R&D includes basic and applied research in the sciences and engineering. It also includes design and development of new products and processes and enhancement of existing products and processes.

R&D includes activities carried on by persons trained, either formally or by experience, in the physical sciences such as chemistry and physics, the biological sciences such as medicine, and engineering and computer science. R&D includes these activities if the purpose is to do one or more of the following things:

1. Pursue a planned search for **new knowledge**, whether or not the search has reference to a specific application. (Basic research)
2. Apply **existing knowledge** to problems involved in the **creation of a new product or process**, including work required to evaluate possible uses. (Applied research)
3. Apply **existing knowledge** to problems involved in the **improvement of a present product or process**. (Development)

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of your responses.

Activities to be **excluded** from R&D:

- In-process R&D
- Test and evaluation once a prototype becomes a production model
- Routine product testing
- Geological and geophysical exploration activities
- Technical services such as:
  - quality and quantity control
  - technical plant sanitation control
  - trouble-shooting in connection with breakdowns in full-scale production
- Advertising programs to promote or demonstrate new products or processes
- Assistance in preparation of speeches and publications for persons not engaged in research and development.
- Social Science R&D which is defined to encompass those activities devoted to further understanding the behavior of groups of human beings or of individuals as members of groups. Some of the topics include the following:
  - Personnel R&D
  - Economic R&D
  - Artificial intelligence and expert systems R&D
  - Consumer, market, and opinion R&D
  - Engineering psychology R&D
  - Management and organization R&D
  - Actuarial and demographic R&D
  - Educational processes and applications R&D
  - R&D in law

286

ITEM BY ITEM INSTRUCTIONS

Section I - GENERAL COMPANY DATA

Item 1 - RECEIPTS AND EMPLOYMENT FOR THE COMPANY

Item 1A - Net Sales, Operating Receipts and Revenues

Include:

- Sales, operating receipts and revenues from all domestic operations of the company, net of returns and allowances. This includes receipts from sales of products and services provided to other companies, individuals, U.S. Government agencies, and foreign countries.
- Net selling value of shipments, f.o.b. plant, after discounts and allowances minus freight charges and excise taxes
- Revenue from investments, rents, and royalties only if it is the principal business of the company. Finance, insurance and real estate companies should include interest, dividends, commissions and rental income as part of revenues.
- Value of assets sold under a capital lease agreement
- Export transfers to your foreign subsidiaries

Exclude:

- Sales and other taxes collected and paid directly to government taxing agencies
- Domestic intra-company transfers
- Receipts from sale of products and services provided by your foreign subsidiaries
- Income from interest, dividends and commissions, (except for companies in the finance, insurance and real estate industries).
- Other nonoperating income (e.g., royalties)

Item 1B - Domestic Company Employment

Include:

- The number of full and part-time employees of the company as defined on Treasury Form 941, Employer's Quarterly Federal Tax Return, and Circular E, Employer's Tax Guide, if filed for the entire company.
- The number of employees in all activities in the 50 States and the District of Columbia during the pay period which includes March 12, 1999.
- Persons on paid sick leave, paid holidays, and paid vacations during the pay period which includes March 12, 1999.

Report the number of employees, not payroll.

Item 2 - NUMBER OF RESEARCH AND DEVELOPMENT SCIENTISTS AND ENGINEERS

Scientists and engineers are defined for this survey as all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences or engineering or mathematics. Their experience is equivalent to completion of a 4-year college course with a major in these fields, regardless of whether or not they actually hold a degree in this field.

The figure on R&D scientists and engineers will be obtained primarily from two sources:

1. For company laboratories performing only research and development, report the number of scientists and engineers employed in January, 2000.
2. For employees whose activities are not solely devoted to R&D, report the proportion of their time that is devoted to R&D. For example, if a company had the full-time equivalent of 60 scientists and engineers in January 2000 and one-fourth of their time was charged to R&D projects, the figure for the number of R&D scientists and engineers for this company would be 15.

Item 3 - COSTS INCURRED FOR RESEARCH AND DEVELOPMENT

► Source of Funds for Research and Development Costs

Federal funds

Include:

- Federally-sponsored research and development performed within the company. Include only the amount of work done on Federal R&D contracts or subcontracts in the current year.
- R&D portion of procurement contracts or subcontracts

Exclude:

- For Item 3A exclude Federal R&D contracts and R&D portions of procurement contracts that your company subcontracted to other R&D organizations. Including these funds would cause duplication in the statistical totals, which include data on work actually performed by each company. Report subcontracted costs in Item 3B.
- Expenditures for independent research and development (IR&D). These are included in company funds. (See definition below.)

Company and other funds

Include:

- Company-sponsored research and development performed within the company and R&D performed under contract from non-Federal sources

Item 3 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT – Continued

Company and other funds – Continued

Include:

- Costs for independent research and development (IR&D). We define IR&D funds as R&D performed by the company for which you anticipate reimbursement by the government through indirect charges for the purchase of products or services. Qualified projects usually have potential interest to the Department of Defense or other agencies of the Federal government. These IR&D funds are excluded from federal funds received for federally-sponsored research and development contracts.
- Costs for which you anticipate reimbursement as company funds. Report expenditures in the period for which they are incurred. Do not include the actual reimbursement.

Item 3A – PERFORMED WITHIN THE COMPANY

▶ Types of R&D Costs

Include as R&D costs:

- Wages, salaries, and related costs
- Materials and supplies consumed
- R&D depreciation
- Cost of computer software used in R&D activities
- Utilities, such as telephone, telex, electricity, water, and gas
- Travel costs and professional dues
- Property taxes and other taxes (except income taxes) incurred on account of the R&D organization or the facilities they use
- Insurance expenses
- Maintenance and repair, including maintenance of buildings and grounds
- Company overhead including: personnel, accounting, procurement and inventory, and salaries of research executives not on the payroll of the R&D organization

Exclude as R&D costs:

- In-process R&D
- Capital expenditures
- Test and evaluation once a prototype becomes a production model
- Patent expenses
- Income taxes and interest
- R&D performed abroad (see Item 3C), such as in Canada and Puerto Rico
- R&D performed by non-company R&D organizations of any kind (see Item 3B)
- Portion of company-held R&D contracts that are subcontracted outside the reporting company (see Item 3B)
- Fellowships, grants, and gifts to promote R&D or the study of science and engineering

Item 3A.1 – Basic Research

Include the cost of research projects which represent original investigation for the advancement of scientific knowledge and which do not have specific immediate commercial objectives, although they may be in the fields of present or potential interest to the reporting company.

Item 3A.2a – Applied Research

Include the cost of research projects which represent investigation in discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes.

Item 3A.2b – Development

Include the cost of projects which represent technical activity concerned with non-routine problems encountered in translating research into products or processes.

Include:

- Expenditures for designing and conducting clinical trials of drugs, pharmaceuticals, or other products that have not been marketed
- Software development
    - Designing and/or adapting software if the application has commercial value (exclude software development for internal use)
    - Beta version of software being developed which has potential commercial application
- Design and operation of pilot plants and semi-work plants
- Engineering activity required to advance the design of a product or process so it meets specific functional and economic requirements
- Design, construction, and testing of prototypes and models including test models for defense contracts
- Designs for special manufacturing equipment and tools
- Preparation of reports, drawings, formulas, specifications, standard practice instructions, or operating manuals

Exclude:

- Software development intended for within company use only
- Beta version of software being developed which does not have potential commercial application
- Routine technical services to customers
- Toolmaking and tool tryout
- Production of detailed construction drawings and manufacturing blueprints
- Pre-production planning

Item 3A.2c – Total Costs for Applied Research and Development

Add line 3A.2a and line 3A.2b.

Item 3A.3 – Total Costs for Basic and Applied Research and Development Performed Within the Company

Add line 3A.1 and line 3A.2c.

▶ **Estimating basic, applied, and development expenditures**

If your company does not keep records that can be allocated to these specific categories, estimate by the following:

1. Isolate projects that clearly fall into the development category of R&D costs. If your company fabricates products, development activity will include the design, construction, and testing of prototypes and models. If your company's R&D involves the development of a "process" as in chemicals and petroleum, this development activity would primarily include the design and operation of pilot plants or semi-work plants.
2. Isolate the organizational units which have R&D activities that can be readily classified based on the function assigned to the unit. R&D work performed in production units as well as in various laboratories is generally classified as development R&D.
3. Distribute the balance of R&D costs on the basis of individual projects or on the basis of other summaries of the work.

Item 3B – OUTSIDE THE COMPANY

Report payments in the form of contracts, grants, and fellowships made to other industrial firms, commercial laboratories, consultants, educational institutions, hospitals, and research institutions or other organizations.

Federal Funds (column 4): Report R&D activities that your company subcontracted to other organizations using **federal funds** you received for R&D contracts and R&D portions of procurement contracts.

Company and Other Funds (column 5): Report R&D activities that your company subcontracted to other organizations using **company or other nonfederal funds**.

Item 3C – FOREIGN

Report the amount of R&D financed by the U.S. parent or its foreign subsidiaries, including Canada and Puerto Rico, and performed by company R&D laboratories, branch plants, or other organizations, located outside the United States. Foreign subsidiaries are those outside the 50 States and the District of Columbia.

Exclude R&D activities performed by foreign subsidiaries which were financed by foreign governments or other outside organizations.

Item 3D – TOTAL

With the exception of "Other funds," this number represents company-sponsored R&D. It is comparable to information reported on Form 10K, if you report to the Securities and Exchange Commission.

Add line 3A.3 (column 5), line 3B (column 5) , and line 3C.

Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 2000

Report the estimated cost of company and other nonfederally sponsored R&D that will be performed within the 50 states and the District of Columbia in 2000. This item is comparable to the 1999 figure reported in Item 3A.3, column 5.

Section II – RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY

Item 5 – COSTS INCURRED FOR FEDERAL RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY PRINCIPAL GOVERNMENT AGENCY

Distribute the cost of Federal research and development work (Item 3A, line 3, columns 1 and 4) by Federal agency – If exact figures are not available by agency, please estimate or apportion according to the number of scientists and engineers working on the Federal projects and/or the costs of Federal programs.

Item 6 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY MAJOR TYPE OF EXPENSE

If most R&D is performed in units where summaries are regularly prepared by element of cost, base the breakdown of research and development costs upon the records of such units. If existing records do not yield figures for this item, the item may be estimated.

Item 6.1 – Wages and Salaries

Report the gross earnings paid in calendar year 1999 to employees engaged in R&D (follow the definition of salaries and wages that is used for calculating the withholding tax). Include salaries of officers in the research establishment(s) if a corporation; exclude payments to proprietor or partners if an unincorporated concern. (Scientists and engineers are defined in item 2.) Exclude employee fringe benefits which are to be reported in Item 6.3 – Other Costs.

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ITEM BY ITEM INSTRUCTIONS – Continued

Item 6.2 – Materials and Supplies

Report the delivered cost for all purchased materials consumed, whether received from other companies, withdrawn from inventory, or received from other establishments of this company. Include all work that was done for your laboratories and other technical units by non-company organizations (for example, model construction by a non-company model shop). Exclude purchases from other R&D organizations.

Item 6.3 – Depreciation

Report depreciation on items related to your R&D activities.

Item 6.4 – Other Costs

Include items related to your R&D activities and not included in Items 6.1, 6.2, and 6.3. Include utilities, books and periodicals, property and other taxes, employee fringe benefits, and company overhead.

Item 7 – COST OF RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY STATE

Report the cost of R&D for each State in which your company has research and development laboratories or facilities. It is not necessary to calculate separately individual assignments which may be made outside the home State of a particular research staff.

As much as 10 percent of the total may, if desired, be reported in line 52 as "Not distributed by State."

Item 8 – ENERGY RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY

Include all spending for R&D to increase energy resources or capabilities, including the development of energy equipment. Energy research and development can include costs of R&D projects (both product and process) on exploration, extraction, transportation, processing, storage, generation (including conversion), distribution, conservation, etc., of present, new, or improved forms of energy. Record energy R&D spending according to type of energy in Items 8A through 8D.

If R&D spending is for joint or multiple purposes, estimate and report the portion of cost incurred for the energy purpose. In the limited number of cases where the separation of joint (multiple) costs by type of energy cannot be estimated, include the total cost of the R&D project when the primary purpose of the project is energy research and development. If the project is not primarily for energy research and development then exclude all of the project cost.

Item 8B – "Fossil Fuels" Include "Synthetic Fuels" and "Mining"

"Synthetic fuels" includes programs designed to convert coal to gaseous and liquid products. "Mining" is composed of programs for developing equipment and techniques to improve the productivity and recovery rates of coal mining.

Item 8C – "Conservation and Utilization"

Includes R&D activities undertaken to reduce consumption either at the point of energy use or in the transmission, transportation, storage, and conversion of energy. Examples of such are R&D undertaken primarily to reduce fuel consumption in manufacturing, to improve the efficiency of transportation of energy products, or to produce an end product which is more efficient in energy consumption.

Item 8D – "All Other Energy"

Includes areas such as wind, waste, hydroelectric, etc. Also include in this category the development of energy equipment which cannot be readily classified in Items 8A through 8C.

Section III – RESEARCH AND DEVELOPMENT PERFORMED OUTSIDE THE DOMESTIC COMPANY WITH COMPANY FUNDS

This section of the report form covers the R&D reported in item 3.C of section I, on page two.

Item 9 – FOREIGN RESEARCH AND DEVELOPMENT BY COUNTRY

Allocate the totals reported in Item 3.C., column 5 by the country in which your various research and development takes place. Estimate the costs associated with each country. If necessary, you may write in countries not listed.

Item 10 – COVERAGE AND OPERATIONAL STATUS

Check the appropriate box if the domestic company expenditures on this form, including all subsidiaries, have R&D. If no, please explain in remarks section or in a transmittal letter.

Item 11 – CERTIFICATION

Report the name and telephone number of the person to contact regarding this report. Please sign and date the form.

If you wish to correspond by E-mail, please provide your E-mail address in the "Remarks" section.

WARNING CONCERNING ELECTRONIC MAIL – The Internet is NOT a secure means of transmitting information unless it is encrypted. If you choose to communicate with the Census Bureau via electronic mail, the Census Bureau cannot guarantee the privacy of the information while transmitted, but will safeguard it in accordance with Title 13. Be advised that making inquires regarding this survey via electronic mail may divulge your participation in this survey.

PLEASE RETURN BY:

OMB No. 3145-0027: Approval Expires 12/31/2001

FORM **RD-1A**
(1-6-2000)

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1999

NOTICE — Your report to the Census Bureau is **confidential** by law (title 13, U.S. Code).

The instructions and definitions on this form are not complete. Please read the enclosed instruction sheet before completing this form.

RETURN TO

▼

U.S. CENSUS BUREAU
1201 East 10th Street
Jeffersonville, IN 47132-0001

MANDATORY REPORTING REQUIREMENTS

Data supplied in items 2A and B and in item 3.A.3, columns 1 and 3 for 1999 on this form will satisfy the mandatory reporting requirements (title 13, U.S. Code).

FROM THE DIRECTOR
U.S. CENSUS BUREAU

We have enclosed your company's report form and instructions for the 1999 "Survey of Industrial Research and Development" (R&D). **Please read the definition of R&D on page 2 of the form** and review Item 1. If your company does not conduct R&D, please call the Touchtone Data Entry system to report on 1-800-851-2014. **If your company conducted R&D in 1999, please review the instructions, complete the form, and return it within 30 days.** Federal law requires your response to four items identified on the form. Your voluntary response to all other items is needed to assure useful results.

This survey provides information for examining R&D tax credits. Some businesses are able to use R&D tax credits to reduce their Federal tax burden. The data assist public officials in allocating research funding by state, which may well benefit companies like yours. Analysts also use the results to compare R&D spending in this country with other countries to ensure that U.S. businesses are not at a competitive disadvantage.

Information you report should cover the domestic operations of your consolidated enterprise for calendar year 1999. We recognize that providing this information is a burden, and we have worked hard to minimize it. For example, if you do not have book records for any item, **you may provide carefully prepared estimates.** The law that authorizes this survey (Title 13, United States Code) requires that we keep your report in full confidence. Only sworn Census Bureau employees will see your information, and they will use it only for statistical purposes.

We conduct this survey with National Science Foundation (NSF) support. We have enclosed a letter from the Director of the NSF encouraging your response to the survey. If you have any questions, please call my staff on 301-457-1339. Thank you in advance for your cooperation.

Sincerely,

Kenneth Prewitt

Kenneth Prewitt

Enclosures

PLEASE OPEN AND BEGIN THE SURVEY WITH ITEM 1.

RESEARCH AND DEVELOPMENT

R&D includes basic and applied research in the sciences and engineering. It also includes design and development of new products and processes and enhancement of existing products and processes.

R&D includes activities carried on by persons trained, either formally or by experience, in the physical sciences such as chemistry and physics, the biological sciences such as medicine, and engineering and computer science. R&D includes these activities if the purpose is to do one or more of the following things:

1. Pursue a planned search for **new knowledge**, whether or not the search has reference to a specific application. (Basic Research)
2. Apply **existing knowledge** to problems involved in the **creation of a new product or process** including work required to evaluate possible uses. (Applied Research)
3. Apply **existing knowledge** to problems involved in the **improvement of a present product or process**. (Development)

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of your responses.

Activities to be **excluded** from R&D are as follows: research in social sciences or psychology, routine product testing, geological and geophysical exploration activities and technical services.

See instructions for more detail.

Item 1 – CHECK FOR RESEARCH AND DEVELOPMENT

Mark (X) the appropriate box.

201 ☐ Company had R&D in 1999 – *Complete form, enter zeros where applicable, and return this form.*
203 ☐ Company does not conduct R&D – *Call TDE to report (1-800-851-2014).*

NOTE – After reviewing Item 1 if you need further assistance please call (301) 457-1339.

Item 2 – RECEIPTS, EMPLOYMENT AND NUMBER OF SCIENTISTS AND ENGINEERS FOR COMPANY

A. Sales, operating receipts and revenues from all domestic operations of the company, net of returns and allowances. (Report in thousands of dollars)

INCLUDE receipts for sales of products and services provided to other companies, individuals, U.S. Government agencies, and foreign countries from all domestic operations of your company.

1999			
Bil.	Mil.	Thou.	Dol.
102 $			000

B. Report domestic company employment in all activities during the pay period which includes the 12th of March 1999. (Item 1 of I.R.S. Form 941, if Form 941 was filed for the entire company.)

1999
Number
112

292

C. Report the full-time equivalent number of R&D scientists and engineers employed in January 2000. For employees whose activities are not solely devoted to research and development, report the proportion of their time that is devoted to research and development. *(See instructions for examples)*

January 2000
Number
502

Item 3 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT IN 1999

		Source of funds								Total ((1) + (2))			
		Federal (1)				Company and other (2)				(3)			
		Bil.	Mil.	Thou.	Dol.	Bil.	Mil.	Thou.	Dol.	Bil.	Mil.	Thou.	Dol.
A. Performed within the company **1.** Basic research		304 $			000	305 $			000	306 $			000
2. Applied research and development	**a.** Applied research	314 $			000	315 $			000	316 $			000
	b. Development	324 $			000	325 $			000	326 $			000
	c. Total *(Sum of lines a and b)* →	334 $			000	335 $			000	336 $			000
3. TOTAL *(Sum of lines 1 and 2c)* →		344 $			000	345 $			000	346 $			000
B. Outside the company – **Federal** funds and **company** funds for research and development **performed by others** outside the company **within the United States** *(Exclude from 3A.3 above)*		354 $			000	355 $			000	356 $			000
C. Foreign – **Company** funds for research and development **performed by foreign subsidiaries** or other organizations **outside the United States** *(Exclude from 3A.3 and 3B above)*						365 $			000				
D. TOTAL – Company and other funds, except Federal *(This line represents company sponsored research and development with the exception of "other funds.") (Sum of 3A.3 (column 2), B, and C)* →						375 $			000				

Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 2000

Bil.	Mil.	Thou.	Dol.
401 $			000

Item 5A – COVERAGE AND OPERATIONAL STATUS

Are research and development costs for the entire consolidated domestic enterprise, including subsidiaries, reported on this form?

☐ Yes ☐ No – *Please explain in remarks below.*

Was this company owned or controlled by another company on December 31, 1999?

☐ Yes – *Complete 5B.* Date acquired ⟶ 601 Month ____ Year ____ ☐ No

Item 5B – NEW OWNER INFORMATION (See instructions for Coverage Review)

602 Name	603 Address	
604 City	605 State	606 ZIP Code

CHECK ITEM Please complete the check list below BEFORE returning this questionnaire. By checking these items you will reduce the likelihood of our calling you to resolve an error or inconsistency.

	Yes	No
In item 2A:		
1. Sales is reported in **thousands** of dollars	☐	☐
In item 2B:		
2. Your answer describes the number of **employees**, NOT company payroll	☐	☐
In item 3:		
3. Verify that **Federal funds** (column 1) plus **Company funds** (column 2) equals **Total funds** (column 3) for: Basic research (3A.1), applied research (3A.2a), development (3A.2b), total applied research and development (3A.2c), and total costs within the company (3A.3)	☐	☐

IF THE ANSWER TO ANY OF THE ABOVE CHECKS IS "NO", PLEASE MAKE THE NECESSARY CORRECTIONS IN THE APPROPRIATE ITEM(S) OR PROVIDE AN EXPLANATION IN THE REMARKS SECTION.

Item 6 – CERTIFICATION – This report is substantially accurate and has been prepared in accordance with instructions.

Name of person to contact regarding this report	Area code	Number	Extension
Signature of authorized official	Title	701 Date	

801 Remarks (If you wish to correspond by E-mail, please place your E-mail address here.)

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RD-1A(I)
(12-31-99)

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU
COLLECTING AND COMPILING AGENT FOR
THE NATIONAL SCIENCE FOUNDATION
WASHINGTON, DC 20233

INSTRUCTIONS FOR SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1999

FORM RD-1A

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Changes for the 1999 Survey

Implementation of North American Industry Classification System (NAICS)
The North American Industry Classification System is a new classification system developed in partnership among United States, Canada, and Mexico to more accurately describe and reflect our ever-changing economy. It replaces the Standard Industrial Classification system (SIC). If you are interested in learning more about NAICS, please visit the web site **www.ntis.gov/naics**.

GENERAL INSTRUCTIONS

Comprehensive and timely information about the nature and support of corporate research and development activities is an important component in the overall assessment of our nation's scientific and technological resources. The information you provide is used to prepare national measures of industrial research and development (R&D) not available from any other source. By carefully completing this report, the accuracy of this information is assured.

TAX INCENTATIVES – Most states offer some type of incentive for research and development activity. Many of the states offer an income tax credit modeled after the federal research and experimentation tax credit guidelines. Other types of incentives include sales and use tax credits and property tax credit. A few states which offer incentives are California, Minnesota, Washington, and Wisconsin. For further information on state tax incentives, please contact the Comptroller of the Treasury in your state.

DUE DATE – Please complete and return this form in the envelope provided within 30 days. Make a copy for your records.

SURVEY SCOPE – This report covers publicly traded and privately-owned, nonfarm business firms in all sectors of the United States economy. It does not include operations owned by Federal, state or local governments, nonprofit organizations, or trust or pension plans.

If your company is owned by a Federal, state or local government, is a nonprofit organization, or is a trust or pension plan which performs no activity other than investments, do not report. Please note in the remarks section on the back page of the form and return it.

REPORTING ENTITY – Report research and development activities for all domestic operations of your **entire consolidated domestic enterprise**, including subsidiaries and divisions. The term "company" in these instructions refers to the consolidated domestic enterprise. Report for all parts of the company located in the 50 states and the District of Columbia. Report net receipts and employment figures for all parts of the company, even those that do not perform R&D, as long as they are located in the 50 states or the District of Columbia.

If this form has been directed to a holding company, report for all subsidiaries and operations under the ownership and control of the holding company.

COVERAGE REVIEW – Check the appropriate box if this company was owned or controlled by another company on December 31, 1999. If yes, follow the instructions below:

- If your company is owned by a foreign company, please complete the form and fill out the new owner information on the back page of the form.
- If your company was purchased by another company on or prior to March 31, 1999, please complete the new owner information on the back page of the form, sign the form in Item 6, and fax the form to (301) 457–1318.
- If your company was purchased after March 31, 1999, please complete the form for the months prior to the purchase of your company, fill out the new owner information on the back page of the form, and return the form in the envelope provided.

If you have questions, please call the R&D Survey staff at (301) 457-4677 to determine whether you are required to complete the form.

PERIOD COVERED BY THE REPORT – Report figures for calendar year 1999. Fiscal year data are acceptable for all items except for employment, provided your fiscal year ends between September 1999 and March 2000. Please report employment figures (Items 2B and 2C) for the specific times indicated for these items.

HOW TO REPORT – Report all value figures in thousands of dollars. If you cannot answer a question from your company records, please estimate the answer carefully.

Example: 1,123,678,599 dollars.

	Bil.	Mil.	Thou.	Dol.
Report	$1	123	679	000

If you estimate your answers in millions of dollars, please fill the thousands box with zeros.

Example: 1,124

	Bil.	Mil.	Thou.	Dol.
Report	$1	124	000	000

ADDITIONAL FORMS – Photocopies of this form are acceptable. If you require additional forms, write to the U.S. Census Bureau, 1201 East 10th Street, Jeffersonville, IN 47132-0001 or call (812) 218–3331.

FILING EXTENSIONS – If you cannot complete the form in 30 days, request an extension of time by:

- calling the Census Touchtone Data Entry System on 1-800-851-2014 (have your 10-digit Census File Number, "CFN", available. The CFN is printed on the form above your address.)

OR

- writing to the address below (Please include your 10-digit Census File Number):

U.S. Census Bureau
1201 East 10th Street
Jeffersonville, IN 47132-0001

BURDEN HOUR ESTIMATE – Public reporting burden for this collection of information is estimated to average 1 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimates or any other aspects of this collection of information including suggestions for reducing this burden to Gail A. McHenry, National Science Foundation, 4201 Wilson Boulevard, Room 485, Arlington, VA 22230.

Direct **QUESTIONS** regarding this form to the U.S. Census Bureau, Manufacturing and Construction Division, ATTN.: Special Studies Branch, Room 2135/4, Washington, DC 20233–6900, call (301) 457–1339 or E-mail to ronald.w.taylor@ccmail.census.gov. (Please see the instructions for Item 6 on page 6 for E-mail warning.)

DEFINITION OF RESEARCH AND DEVELOPMENT

R&D includes basic and applied research in the sciences and engineering. It also includes design and development of new products and processes and enhancement of existing products and processes.

R&D includes activities carried on by persons trained, either formally or by experience, in the physical sciences such as chemistry and physics, the biological sciences such as medicine, and engineering and computer science. R&D includes these activities if the purpose is to do one or more of the following things:

1. Pursue a planned search for **new knowledge**, whether or not the search has reference to a specific application. (Basic research)

2. Apply **existing knowledge** to problems involved in the **creation of a new product or process**, including work required to evaluate possible uses. (Applied research)

3. Apply **existing knowledge** to problems involved in the **improvement of a present product or process**. (Development)

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of your responses.

Activities to be **EXCLUDED** from R&D:

- In-process R&D
- Test and evaluation once a prototype becomes a production model
- Routine product testing
- Geological and geophysical exploration activities
- Technical services such as:
  - quality and quantity control
  - technical plant sanitation control
  - trouble-shooting in connection with breakdowns in full-scale production
- Advertising programs to promote or demonstrate new products or processes
- Assistance in preparation of speeches and publications for persons not engaged in research and development.
- Social Science R&D which is defined to encompass those activities devoted to further understanding the behavior of groups of human beings or of individuals as members of groups. Some of the topics include the following:
  - Personnel R&D
  - Economic R&D
  - Artificial intelligence and expert systems R&D
  - Consumer, market, and opinion R&D
  - Engineering psychology R&D
  - Management and organization R&D
  - Actuarial and demographic R&D
  - Educational processes and applications R&D
  - R&D in law

ITEM BY ITEM INSTRUCTIONS

Item 1 - CHECK FOR RESEARCH AND DEVELOPMENT

Check the box that best describes the R&D activities of your company. If your company performed R&D in 1999 then check box 201 and continue with Item 2.

If your company did **not** conduct R&D in 1999 then **call the Census Touchtone Data Entry system at 1-800-851-2014 to complete the survey.** Have your 10-digit Census File Number (CFN) ready before calling. The CFN is located above the address. This system will allow you to report that your company performed no R&D in 1999. Do not mail in the form.

Alternatively, check the appropriate box, 203, on the form. Do not complete the data items. Go to Item 6, sign and return the form in the envelope provided. **You must call or mail in the form to complete your reporting requirements for the survey.**

Item 2 - RECEIPTS, EMPLOYMENT AND NUMBER OF SCIENTISTS AND ENGINEERS FOR COMPANY

Item 2A - Net Sales, Operating Receipts and Revenues

Include:

- Sales, operating receipts and revenues from all domestic operations of the company, net of returns and allowances. This includes receipts from sales of products and services provided to other companies, individuals, U.S. Government agencies, and foreign countries.
- Net selling value of shipments, f.o.b. plant, after discounts and allowances minus freight charges and excise taxes.
- Revenue from investments, rents, and royalties only if it is the principal business of the company. Finance, insurance and real estate companies should include interest, dividends, commissions and rental income as part of revenues.
- Value of assets sold under a capital lease agreement
- Export transfers to your foreign subsidiaries

ITEM BY ITEM INSTRUCTIONS – Continued

Item 2A – Net Sales, Operating Receipts and Revenues – Continued

Exclude:

- Sales and other taxes collected and paid directly to government taxing agencies
- Domestic intra-company transfers
- Receipts from sale of products and services provided by your foreign subsidiaries
- Income from interest, dividends and commissions, (except for companies in finance, insurance and real estate industries).
- Other nonoperating income (e.g., royalties)

Item 2B – Domestic Company Employment

Include:

- The number of full/part-time employees of the company as defined on Treasury Form 941, Employer's Quarterly Federal Tax Return, and Circular E, Employer's Tax Guide, if filed for the entire company.
- The number of employees in all activities in the 50 States and the District of Columbia during the pay period which includes March 12, 1999.
- Persons on paid sick leave, paid holidays, and paid vacations during the pay period which includes March 12, 1999.

Report the number of employees, not payroll.

Item 2C – Number of Research and Development Scientists and Engineers

Scientists and engineers are defined for this survey as all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences or engineering or mathematics. Their experience is equivalent to completion of a 4-year college course with a major in these fields, regardless of whether or not they actually hold a degree in this field.

The figure on R&D scientists and engineers will be obtained primarily from two sources:

1. For company laboratories performing only research and development, report the number of scientists and engineers employed in January, 2000.
2. For employees whose activities are not solely devoted to R&D, report the proportion of their time that is devoted to R&D. For example, if a company had the full-time equivalent of 60 scientists and engineers in January 2000 and one-fourth of their time was charged to R&D projects, the figure for the number of R&D scientists and engineers for this company would be 15.

Item 3 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT

▶ Source of Funds for Research and Development Costs

Federal funds

Include:

- Federally-sponsored research and development performed within the company. Include only the amount of work done on Federal R&D contracts or subcontracts in the current year.
- R&D portion of procurement contracts or subcontracts

Exclude:

- For Item 3A exclude Federal R&D contracts and R&D portions of procurement contracts that your company subcontracted to other R&D organizations. Including these funds would cause duplication in the statistical totals, which include data on work actually performed by each company. Report subcontracted costs in Item 3B.
- Expenditures for independent research and development (IR&D). These are included in company funds. (See definition below.)

Company and other funds

Include:

- Company-sponsored research and development performed within the company and R&D performed under contract from non-Federal sources
- Costs for independent research and development (IR&D). We define IR&D funds as R&D performed by the company for which you anticipate reimbursement by the government through indirect charges for the purchase of products or services. Qualified projects usually have potential interest to the Department of Defense or other agencies of the Federal government. These IR&D funds are excluded from federal funds received for federally-sponsored research and development contracts.
- Costs for which you anticipate reimbursement as company funds. Report expenditures in the period for which they are incurred. Do not include the actual reimbursement.

Item 3A – PERFORMED WITHIN THE COMPANY

▶ Types of R&D Costs

Include as R&D costs:

- Wages, salaries, and related costs
- Materials and supplies consumed
- R&D depreciation

ITEM BY ITEM INSTRUCTIONS – Continued

Item 3A – PERFORMED WITHIN THE COMPANY – Continued

Types of R&D Costs – Continued

Include as R&D costs – Continued:

- Cost of computer software used in R&D activities
- Utilities, such as telephone, telex, electricity, water, and gas
- Travel costs and professional dues
- Property taxes and other taxes (except income taxes) incurred on account of the R&D organization or the facilities they use
- Insurance expenses
- Maintenance and repair, including maintenance of buildings and grounds
- Company overhead including: personnel, accounting, procurement and inventory, and salaries of research executives not on the payroll of the R&D organization

Exclude as R&D costs:

- In-process R&D
- Capital expenditures
- Test and evaluation once a prototype becomes a production model
- Patent expenses
- Income taxes and interest
- R&D performed abroad (see Item 3C), such as in Canada and Puerto Rico
- R&D performed by non-company R&D organizations of any kind (see Item 3B)
- Portion of company-held R&D contracts that are subcontracted outside the reporting company (see Item 3B)
- Fellowships, grants, and gifts to promote R&D or the study of science and engineering

Item 3A.1 – Basic Research

Include the cost of research projects which represent original investigation for the advancement of scientific knowledge and which do not have specific immediate commercial objectives, although they may be in the fields of present or potential interest to the reporting company.

Item 3A.2a – Applied Research

Include the cost of research projects which represent investigation in discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes.

Item 3A.2b – Development

Include the cost of projects which represent technical activity concerned with non-routine problems encountered in translating research into products or processes.

Include:

- Expenditures for designing and conducting clinical trials of drugs, pharmaceuticals, or other products that have not been marketed
- Software development
  - Designing and/or adapting software if the application has commercial value (exclude software development for internal use)
  - Beta version of software being developed which has potential commercial application
- Design and operation of pilot plants and semi-work plants
- Engineering activity required to advance the design of a product or process so it meets specific functional and economic requirements
- Design, construction, and testing of prototypes and models including test models for defense contracts
- Designs for special manufacturing equipment and tools
- Preparation of reports, drawings, formulas, specifications, standard practice instructions, or operating manuals

Exclude:

- Routine technical services to customers
- Toolmaking and tool tryout
- Production of detailed construction drawings and manufacturing blueprints
- Pre-production planning
- Software development intended for within company use only
- Beta version of software being developed which does not have potential commercial application

Item 3A.2c – Total Costs for Applied Research and Development

Add line 3A.2a and line 3A.2b.

ITEM BY ITEM INSTRUCTIONS – Continued

Item 3A.3 – Total Costs for Basic and Applied Research and Development Performed Within the Company

Add line 3A.1 and line 3A.2c.

▶ **Estimating basic, applied, and development expenditures**

If your company does not keep records that can be allocated to these specific categories, estimate by the following:

1. Isolate projects that clearly fall into the development category of R&D costs. If your company fabricates products, development activity will include the design, construction, and testing of prototypes and models. If your company's R&D involves the development of a "process" as in chemicals and petroleum, this development activity would primarily include the design and operation of pilot plants or semi-work plants.
2. Isolate the organizational units which have R&D activities that can be readily classified based on the function assigned to the unit. R&D work performed in production units as well as in various laboratories is generally classified as development R&D.
3. Distribute the balance of R&D costs on the basis of individual projects or on the basis of other summaries of the work.

Item 3B – OUTSIDE THE COMPANY

Report payments in the form of contracts, grants, and fellowships made to other industrial firms, commercial laboratories, consultants, educational institutions, hospitals, and research institutions or other organizations.

Federal Funds (column 1): Report R&D activities that your company subcontracted to other organizations using **federal funds** you received for R&D contracts and R&D portions of procurement contracts.

Company and Other Funds (column 2): Report R&D activities that your company subcontracted to other organizations using **company or other nonfederal funds**.

Item 3C – FOREIGN

Report the amount of R&D financed by the U.S. parent or its foreign subsidiaries, including Canada and Puerto Rico, and performed by company R&D laboratories, branch plants, or other organizations, located outside the United States. Foreign subsidiaries are those outside the 50 States and the District of Columbia.

Exclude R&D activities performed by foreign subsidiaries which were financed by foreign governments or other outside organizations.

Item 3D – TOTAL

With the exception of "Other funds," this number represents company-sponsored R&D. It is comparable to information reported on Form 10K, if you report to the Securities and Exchange Commission.

Add line 3A.3 (column 2), line 3B (column 2) , and line 3C.

Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 2000

Report the estimated cost of company and other nonfederally sponsored R&D that will be performed within the 50 states and the District of Columbia in 2000. This item is comparable to the 1999 figure reported in Item 3A.3, column 2.

Item 5A – COVERAGE AND OPERATIONAL STATUS

Check the appropriate box indicating whether or not R&D costs for the entire consolidated domestic enterprise, including subsidiaries were reported on this form. If no, please explain in the remarks section.

Check the appropriate box whether this company was owned or controlled by another company on December 31, 1999. If yes, please report the month and year your company was acquired and fill out the new owner information in Item 5B. Please see "COVERAGE REVIEW" in the General Instructions for a description of how to proceed in filling out the form.

Item 5B – NEW OWNER INFORMATION

If the company was owned or controlled by another company on December 31, 1999, provide the name and address of the new owner. In the "Remarks" section, specify the change or correction, e.g., wholly-owned subsidiary of ABC Company", "merger with XYZ Company", "acquired by 123 Corporation".

CHECK ITEM

Mark "Yes" or "No" as appropriate for each of the checks in this item. If the answer is "No" provide an explanation in the remarks section.

Item 6 – CERTIFICATION

Report the name and telephone number of the person to contact regarding this report. Please sign and date the form.

If you wish to correspond by E-mail, please put your E-mail address in the remarks section.

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